GRAMMATICAL ERRORS IN BILINGUAL MATHEMATICS MEDIA FOR GRADE EIGHT STUDENTS DEVELOPED BY THE DIRECTORATE OF DEVELOPMENT OF JUNIOR HIGH SCHOOL, DIRECTORATE GENERAL OF MANAGEMENT OF BASIC AND JUNIOR EDUCATION, MINISTRY OF NATIONAL EDUCATION AND CULTURE

A THESIS

Presented as a Partial Fulfillment of the Requirements for the Attainment of a *Sarjana Pendidikan* Degree in English Education Program

BY:
BERLIAN ADITYAS UTAMI
05202241056

ENGLISH EDUCATION DEPARTMENT
LANGUAGE AND ART FACULTY
YOGYAKARTA STATE UNIVERSITY
2012

APPROVAL

Grammatical Errors in Bilingual Mathematics Media for Grade Eight Students Developed by the Directorate of Development of Junior High School, Directorate General of Management of Basic and Junior Education, Ministry of National Education and Culture

A Thesis

By

Berlian Adityas Utami

05202241056

Approved by the Consultants on

First Consultant,	Second Consultant,
Suhaini M. Saleh, M. A.	Nunik Sugesti, M. Hum.
NIP. 19540120 197903 1 002	NIP. 19710616 200604 2 001

RATIFICATION

Grammatical Errors in Bilingual Mathematics Media for Grade Eight Students Developed by the Directorate of Development of Junior High School, Directorate General of Management of Basic and Junior Education, Ministry of National Education and Culture

A Thesis

Accepted by the Board of Thesis Examiners of Faculty of Languages and Arts, State University of Yogyakarta on July 11, 2011 and declared to have fulfilled the requirement to acquire a *Sarjana Pendidikan* Degree in English Literature

Board of Examiners

Chairperson	:	Jamilah, M. Pd.	.....
Secretary	:	Nunik Sugesti, M.Hum.	.....
First Examiner	:	Suharso, M. Pd.	.....
Second Examiner	:	Suhaini M. Saleh, M. A	.....

Yogyakarta, 13th of January , 2012

Faculty of Languages and Arts

State University of Yogyakarta

Dean,

Prof. Dr. Zamzani

NIP. 19550505 198011 1 001

PERNYATAAN

Yang bertanda tangan di bawah ini saya:

Nama	: Berlian Adityas Utami
NIM	: 05202241056
Program Studi	: Pendidikan Bahasa Inggris
Fakultas	: Bahasa dan Seni
Judul Karya Ilmiah	: GRAMMATICAL ERRORS IN BILINGUAL MATHEMATICS MEDIA FOR GRADE EIGHT STUDENTS DEVELOPED BY THE DIRECTORATE OF DEVELOPMENT OF JUNIOR HIGH SCHOOL, DIRECTORATE GENERAL OF MANAGEMENT OF BASIC AND JUNIOR EDUCATION, MINISTRY OF NATIONAL EDUCATION AND CULTURE

menyatakan bahwa karya ilmiah ini adalah hasil pekerjaan saya sendiri. Sepanjang pengetahuan saya, karya ilmiah ini tidak berisi materi yang ditulis orang lain, kecuali bagian-bagian tertentu yang saya ambil sebagai acuan dengan mengikuti tata cara dan etika penulisan karya ilmiah yang lazim.

Apabila terbukti bahwa pernyataan ini tidak benar, sepenuhnya menjadi tanggung jawab saya.

Penulis

Berlian Adityas Utami

MOTTOS

Forever is composed of nows

Emily Dickinson

The way I see it, if you want a rainbow, you gotta put up with rain

Dolly Parton

To Mama and Papa,

And everyone who has been expecting this from me,

With love.

ACKNOWLEDGEMENTS

Alhamdulillahirobbil'alamin, all praise be to God, for the life and all that it brings. Having accomplished this thesis, I feel indebted to many people who helped and inspired me during the making of this thesis.

I would like to express my deepest gratitude to my advisors, Suhaini M. Saleh, M.A, as my first advisor and Nunik Sugesti, M. Hum., as my second advisor for their advice and willingness of sharing their brilliant thoughts with me, which were very fruitful for shaping up my ideas of this research. Many thanks go to the lectures of English Department, from whom I gain my knowledge and experience, also to the library staff of faculty of Languages and Arts.

Countless thanks also go to my family and friends for their support, without which I will never be able to finish this thesis. I always feel their love in their millions of prayers. I feel very lucky for having my mother and father since they are the ones who always believe that I can do what I do and believe that I can do what I do well. They are more than I can wish for for a family.

I am giving my best to this thesis, but it is far from being perfect. Therefore, I would accept any suggestions and criticism for the betterment of this thesis.

Yogyakarta, January 2012

Berlian Adityas Utami

TABLE OF CONTENTS

TITLE i
APPROVAL ii
RATIFICATION iii
PERNYATAAN iv
MOTTOS v
DEDICATIONS vi
ACKNOWLEDGEMENTS vii
TABLE OF CONTENTS viii
LIST OF TABLES xii
LIST OF ABBREVIATIONS xiii
ABSTRACT xiv

CHAPTER I. INTRODUCTION 1
A. Background of the Research 1
B. Identification of the Research 3
C. Limitation of the Research 5
D. Formulation of the Research 5
E. Objectives of the Research 5
F. Significance of the Research 6

CHAPTER II. LITERATURE REVIEW AND ANALYTICAL CONSTRUCT 7
A. Literature Review 7
1. English as an International Language 8
2. English Grammar 8
3. Morphology 13
4. Syntax 14
5. English for Specific Purposes 16

6. Error Analysis 19
7. Errors and Mistakes 22
8. Teaching Materials 32
9. About the Description of Mathematics Bilingual Media for Grade Eight Developed by the Directorate of Development of Junior High School, Directorate General of Management of Basic and Junior Education, Ministry of National Education 34

B. Relevant Studies 34

C. Conceptual Framework and Analytical Construct 35

1. Conceptual Framework 35
2. Analytical Construct 36

CHAPTER III. RESEARCH METHOD 38
A. Type of Research 38
B. Data Type 38
C. Data Collection 39
D. Data Sources 39
E. Research Instruments 39
F. Data Analysis 39
G. Trustworthiness 40

CHAPTER IV. FINDINGS AND DISCUSSION 41
A. Descriptive Findings and Valuings 41
1. The Description of Errors Occurring in Mathematics Bilingual Media 41
a. Overt Errors Occuring in the Media 42
b. Covert Errors occuring in the Media 43
2. The Description of Causes and Corrections of the Errors 44
a. Causes of the Errors 44

b. Corrections for the Errors 45
B. The Explanatory Findings and Description 45
1. Overt Errors Occurring in the Media 45
a. Omission in Morphology 46
b. Omission in Lexicon 46
c. Omission in Syntax 47
d. Addition in Morphology 47
e. Addition in Lexicon 48
f. Addition in Syntax 49
g. Selection in Morphology 49
h. Selection in Lexicon 49
i. Selection in Syntax 50
j. Ordering in Morphology 50
k. Ordering in Lexicon 50
l. Ordering in Syntax 51
2. Covert Errors Occurring in the Media 51
a. Omission in Morphology 51
b. Omission in Lexicon 51
c. Addition in Morphology 52
d. Addition in Lexicon 52
e. Addition in Syntax 52
f. Selection in Lexicon 53
g. Selection in Syntax 53
h. Ordering in Morphology 53
i. Ordering in Lexicon 54
j. Ordering in Syntax 54
3. Errors Not Occurring in the Media 55
4. The Causes of Errors in the Media 55
a. Interlanguage 56
b. Intralanguage 56

c. Communication Strategies 57
1) Cognitive and Personality Style 57
2) Language Switch 57
5. Correting Errors Found in the Media 58
a. Correcting Omission Errors 58
b. Correcting Addition Errors 59
c. Correcting Selection Errors 59
d. Correcting Ordering Errors 59
e. Correcting Errors Caused by Interlanguage Transfer 60
f. Correcting Errors Caused by Intralanguage Transfer 61
g. Correcting Errors Caused by Cognitive and Personality Style 62
h. Correcting Errors Caused by Language Switch 62
6. Further Discussions on the Errors Found in the Media 63
a. Omission Overt Errors in the Media 64
b. Addition Overt Errors in the Media 65
c. Selection Overt Errors in the Media 66
d. Ordering Overt Errors in the Media 67
e. Omission Covert Errors in the Media 68
f. Addition Covert Errors in the Media 69
g. Selection Covert Errors in the Media 69
h. Ordering Covert Errors in the Media 70

CHAPTER V. CONCLUSION AND SUGGESTIONS71

A. Conclusion 72
B. Suggestions 74
1. For the Media Developer 74
2. For the Teachers 74
3. For the Other Researchers 74

BIBLIOGRAPHY 76

APPENDIX 80

LIST OF TABLES

Table 1. Errors Occurring in the Media 41

Table 2. Overt Errors Occurring in the Media 42

Table 3. Covert Errors Occurring in the Media 43

Table 4. Causes of Errors 45

LIST OF ABRREVIATION

M : in Morphology

L : in Lexicon

S : in Syntax

Inter : Interlingual Transfer

Intra : Intralingual Transfer

Cont : Context of Learning

Av : Avoidance

Pr : Prefabricated Pattern

Co : Cognitive and Personality Style

Ap : Appeal to Authority

La : Language Switch

GRAMMATICAL ERRORS IN BILINGUAL MATHEMATICS MEDIA FOR GRADE EIGHT STUDENTS DEVELOPED BY THE DIRECTORATE OF DEVELOPMENT OF JUNIOR HIGH SCHOOL, DIRECTORATE GENERAL OF MANAGEMENT OF BASIC AND JUNIOR EDUCATION, MINISTRY OF NATIONAL EDUCATION AND CULTURE

By

Berlian Adityas Utami

05202241056

ABSTRACT

This research revealed the grammatical errors found in bilingual mathematics media developed by The Directorate of Development of Junior High School, Directorate General of Management of Basic And Junior Education, Ministry of National Education and Culture. It focused on: 1) the classifications of errors found in the media; 2) the causes of errors found in the media; and 3) the corrections of the errors found in the media.

This research used both qualitative and quantitative methods in analyzing the qualitative data. The data were sentences taken from the media. The data were analyzed to classify the types of errors, determine the causes of errors, and correct the errors found.

The findings of this research were 1) The errors in the media were classified into omission overt error in: morphology, lexicon, and syntax; addition overt error in: morphology, lexicon, and syntax; selection overt error in morphology, lexicon, and syntax; ordering overt error in morphology, lexicon, and syntax; omission covert error in morphology and lexicon; addition covert error in morphology, lexicon, and syntax; selection covert error in lexicon and syntax; ordering covert error in morphology, lexicon, and syntax; 2) The causes of the errors were interlingual transfer, intralingual transfer, cognitive and personality style, and language switch; and 3) Some corrections were needed for the types of errors found; Omission errors needed addition of missing elements, addition errors needed elimination of unnecessary items, selection errors needed correct selection of the incorrect elements, and ordering errors needed the elements to be re-ordered and or revised. Errors caused by intralingual needed to be translated into Bahasa Indonesia before correction, errors caused by interlingual needed to be corrected using the correct grammar rule, errors caused by cognitive and personality syle needed to be checked, and errors caused by language switch needed to be translated into English.

Key words: ***Grammatical Error, Error Analysis, Bilingual media***

CHAPTER I

INTRODUCTION

A. Background of the Research

The government of Indonesia has always been making efforts to improve the national education quality. In 2003, the government issued the Regulation of Ministry of National Education and Culture on the National Education System. It is mentioned in the Regulation Number 20 Act 50 that the central government and or regional government should run at least one educational unit of each educational level to be that of international standard. The medium of instruction in international standard schools should be English and the international standard schools should employ Information and Communication Technology (ICT) in the teaching and learning process. Hence, the phenomenon of using bilingual media and computerization in the teaching and learning process has become a new trend in the educational field in Indonesia.

The implication to the policy of International Standard School has made the role of English teachers not merely as teachers who teach the language to students in the classroom. They have to be prepared with a skill as the counselor when teachers of other subjects find difficulties with their English. They are the ones who should answer other teachers' questions upon the introductory language in the classroom, the media and source of learning used, and so forth, regardless of some English training conducted for teachers. Therefore, English teachers and teacher students of English should have an idea upon English used

in other subjects. However, their knowledge is relatively limited since they are not engaged with English used in other subjects.

The Directorate of Development of Junior High School of the Directorate General of Management of Basic and Junior Education, Ministry of National Education and Culture, as the highest department of education for junior high schools in Indonesia, has developed bilingual media to support the policy of international standard school. The media developed are media for science subjects, including mathematics. The science and mathematics are subjects of which junior high school students are required to master in order to pass the national examination in Bahasa Indonesia as well as the international examination in English. The media are developed using flash player which enable students to grasp the lesson through animations, illustrations, and spoken explanation in Bahasa Indonesia as well as English. The media also facilitate students with self-learning access. However, before they are applied in junior high schools, some researches have to be done to evaluate the media.

One of the concerns of the bilingual media developed by the Directorate of Development of Junior High School is the use of English. Since it uses both spoken and written expression of English, it is necessary to make sure that the English used in the media is accurate. The English accuracy in the media can be seen from the use of correct grammar and pronunciation. The correct grammar and pronunciation are essential since the media will model the use of natural English to the students. Towards that extend, the researcher feels that it is

important to analyze and evaluate the English used in the media especially in relation with the grammar used.

This research is a descriptive research. The descriptive analysis will describe the problems in the field without testing any hypotheses. Once the data collected, a qualitative analysis is employed in analyzing the qualitative data gathered using some valid, reliable instruments.

B. Identification of the Problem

There has been no research conducted upon the media developed by the Directorate of Development of Junior High School. The study is essential in order to evaluate the appropriateness and feasibility of the media when applied in schools. There are some aspects, which need to be analyzed from the bilingual media. The aspects cover the content aspect and performance aspect. The content aspect is the aspect that deals with the content in the media such as the materials and the language used. The performance aspect deals with the technology applied and how effective the media works when it is run.

Firstly, the content has matter aspect and linguistics aspect, which need to be evaluated. Matter consists of basic competence, materials, lesson, and activities. It is necessary to analyze whether they are appropriately developed and suitable in classroom teaching and learning process. Until a literature research is conducted, this question cannot be answered. The linguistic aspect of the media is presented in Bahasa Indonesia and English. The linguistic aspect concerns the use of grammar, pronunciation, and the translation of the first language (Bahasa

Indonesia) into the second language (English). English has become a concern since it has to be accurately as well as naturally employed in the media to model the students. Since there has been no analysis conducted, the linguistic aspect in the media is still questionable.

There are some errors occuring in the use of English in the bilingual media developed by the Directorate of Development of Junior High School. First, the media lacks of grammar accuracy. The errors cover the incorrect choice of phrase and the incorrect punctuation. The incorrect phrases have no meaning in English and the incorrect punctuation causes ambiguity. Second, there are some words which are pronounced incorrectly. Third, the English version of the media is merely the translation from the Bahasa Indonesia version so that it lacks of naturalness.

Secondly, the evaluation of the performance of the media is determined by experimental research conducted upon the media. It is necessary to apply the media in a real classroom to see the feasibility of the media. The result of the research will be a reference to develop a more suitable technology and statistical data which can be used to measure the effectiveness of the media. The technology applied also needs to be adapted to the students' ability so that they don't find any difficulties using the media but still find it challenging. The problems in technology are mainly about the sounds produced by the media. The dubbing is not the same as the running text in some parts. The speed of the speech is sometimes not natural due to the duration of the animation.

C. Limitation of the Problem

The researcher chose mathematics media for grade eight students of junior high school developed by the Directorate of Development of Junior High School to be analyzed. Due to the researcher's knowledge, time, and ability, this research was limited to the linguistics aspect of the media. It focused on the errors in writing expressions of English in the mathematics media in terms of morphology, lexicon, and syntax.

D. Formulation of the Problem

Based on the limitation and consideration that it is essential to conduct an analysis upon the linguistics aspect of the media, this research attempts to answer following questions:

1. What are the classifications of errors found in the media?
2. What are the causes of the errors?
3. How can the errors be corrected?

E. Objectives of the Research

In line with the formulation of the problems, this research is aimed at:

1. describing the classifications of errors found in the media,
2. describing the causes of errors, and
3. providing the corrections for the errors.

F. Significance of the Research

There are some benefits expected to be achieved from this research:

1. Academically
    a. The research findings can be used as a reference to conduct further analysis upon media developed by the Directorate of Development of Junior High School and its implementation.
    b. The research findings can be resulted in one of the considerations to improve the linguistics aspect of the media.
    c. The research findings can provide information and aid for the students of the English Education Department who have the same interest in the subject of study of grammar.
    d. The result of this research can be a helpful insight to the study of English grammar, particularly when it is used in mathematics bilingual media.
    e. This research can promote the study of bilingual media which is compulsory in teaching in international standard schools.
2. Practically

    This research is conducted to enrich the English teacher students' knowledge in particular and the reader's knowledge in general upon English grammatical accuracy. When one acquires a good knowledge of English grammatical accuracy, one will be able to use English in formal occasions such as in the classroom, and to produce English texts for academic purposes.

CHAPTER II

LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

A. Literature Review

This chapter discusses some theories or literatures that support the study. They will be presented and discussed before conceptual framework for this research drawn.

1. English as an International Language

English has achieved a prestigious place as an International language not only through voyages of expedition thousands of years ago but also because of the economic development in the twentieth centuries along with the power of media (Crystal, 2000: 24-25). With regards to English as International language (EIL) McKay in Seidlhofer (2003: 8) points out that International English is used by native speakers of English and bilingual users of English for cross-cultural communication. International English can be used both in a local sense between speakers of diverse cultures and languages within one country and in a global sense between speakers from different countries.

There are two important issues of English as an international language which are delivered by Brown (2000). The issues are (1) English is increasingly being used as a tool for interaction among nonnative speakers. Well over one half of the one billion English speakers of the world learned English as a second (or foreign) language. Most English language teachers across the globe are nonnative English speakers, which

means that the norm is not monolingualism, but bilingualism. (2) English is not frequently learned as a tool for understanding and teaching US or British cultural values. Instead, English has become a tool for international communication in transportation, commerce, banking, tourism, technology, diplomacy, and scientific research.

It is clear that English is an international language spoken by almost everyone in every country for many purposes. Since English is used widely, bilingualism is a further phenomenon after the phenomenon of English as an international language.

2. English Grammar

Some experts have tried to define what language is. According to Hornby (1995) language is the system of sounds and words used by humans to express their thoughts and feelings. It is also the words and phrases used by a particular group or profession. It means that a language is a kind of system possessed and used by some particular communities in order to communicate and share ideas to one another. Under the influence of Zellig Harris and Noam Chomsky, many linguists have argued that a grammar is a system of rules.

Eggins (2004: 3) says that language is a semiotic system. Its function is to make meanings by involving sets of meaningful choices and oppositions. She also says that the process of using a language is called a semiotic process. Like other semiotic system, language involves two aspects: content (meaning) and representation (expression). As a semiotic

system, language can be called a complex semiotic system since, unlike most simple semiotic systems which consist of two levels or strata; it needs three levels or strata to describe the language itself. First, meanings are realized through wordings. Then, wordings are realized again through phonology or graphology. Third, language has a special level, the so-called lexicogrammar that makes it possible to create potential unlimited numbers of expression (Eggins, 2004: 116). To create them, the lexicogrammar provides the means; they are words and structures, or the arrangements of these words.

Finch (2000) argues that the grammar of a language consists of a set of rules which native speakers intuitively follow in the production of well-formed construction. The linguistic rules are internal, as opposed to external constraints and, as such, unconsciously present in the mind of native speakers. They are better understood as principles by which the language operates. Having said that, however, he explains further that 'grammar' is a word which is open to a number of different uses and interpretations.

The sounds and sound patterns, the basic units of meaning, such as words, and the rules to combine them to form new sentences constitute the grammar of a language. The grammar, then, is what we know; it represents our linguistics competence. To understand the nature of a language we must understand the nature of this internalized, unconscious set of rules, which is a part of every grammar of every language (Fromkin: 1983).

The notion of grammar according to Fromkin refers to descriptive and perscriptive grammar. She explained that although there may be some differences among speakers' knowledge of a language, there must be shared language because it is this grammar that makes it possible to communicate through language. To the extent that the linguist's description is a true model of a speaker's linguistic capacity, it will be a successful description of the grammar and the language itself. Such a model is called a descriptive grammar. Furthermore, she explains that descriptive grammar describes basic linguistic knowledge. It explains one's ability to speak and understand, and tells what one knows about the sounds, words, phrases, and sentences of one's language. Meanwhile, numerous English grammarians from the eighteenth and nineteenth centuries wished to prescribe grammar, which gives birth to prescriptive grammar. Its goal is to tell people the rules they have to know rather than to describe the rules that they know. When we say that a sentence is grammatical, we mean that it conforms to the rules of both grammars; conversely, an ungrammatical sentence deviates in some way from these rules.

Halliday (1985) defines a system in viewing grammar as a function, called systemic functional grammar. The conceptual framework is that it is based on a function one rather than the formal one. It is functional in three distinct senses: in its interpretations of texts, of the system, and of the elements of linguistic structures.

Following this, the theory is defined in three senses. Firstly, it is functional in the sense that it is designed to account for how the language is used. Every text unfolds in some context of use. A functional grammar is essentially a 'natural grammar', in the sense that everything in it can be explained by reference to how the language is used. Secondly, the fundamental components of meaning in language are functional components. All languages are operated by two kinds of meaning, the ideational or 'reflective' meaning and the interpersonal or 'active' meaning. These components called 'metafunction' are the manifestations in the linguistic system of the two very general purposes which underlie all uses of language: to understand the environment (ideational) and to act on the others in it (interpersonal). Thirdly, the each element in a language is explained by reference to its function in the total linguistic system. In this third sense, a functional grammar is one that construes all the units of a language—clauses, phrases, and so on—as organic configuration of functions. in other words, each part is interpreted as functional with respect to the whole. The stages of coding process from meaning to expression are semantics, grammar (syntax), and phonology (Halliday, 1985)

VanVallin and LaPolla in Purpura (2004: 5-6) argue that most linguists have embraced one of two general perspectives to describe linguistic phenomena. Either they take a syntactocentric perspective of language, where syntax is the central feature to be observed and analyzed,

or they adopt a communication perspective of language, where the observational and analytic emphasis is on how language is used to convey meaning. In the syntactocentric view of language, formal grammar is defined as a systematic way of accounting for and predicting an 'ideal' speaker's or hearer's knowledge of a language. This is done by a set of rules or 'principles' that can be used to generate all well-formed or grammatical utterances in the language. Syntactocentric theories of language have provided L2 educators with wealth information about grammatical forms and the rules that govern them. In fact, most classroom language teachers draw extensively on this information as a basis for syllabus design, material preparation, instruction, and classroom assessment. These theories have also informed L2 teachers and testers in their efforts to identify linguistic content for tests so that more general inferences about language ability can be made (Purpura, 2004: 6).

Moreover, Finch (2000) argues that knowing the grammar of a language means knowing two basic things about it: first, what changes are required to individual words according to the way in which they are used, termed morphology, and second, the rules governing the combination of words into phrases, clauses, and sentences (Finch, 2000: 78). The study is called syntax.

3. Morphology

Morphology can be defined as "a branch of linguistics concerned with analyzing the structure of words. The morphology of a given word is its structure or form" (Baldick, 2001). A word is considered to be made of smaller unites called morphemes that can carry a meaning or a grammatical function. There are two kinds of morphemes, free morphemes and bound morphemes. (1) A free morpheme can stand by itself as a single word, for example, man, walk, and; whereas a (2) bound morpheme cannot normally stand alone such as the plural –s in workers. Free morphemes are classified into (a) lexical morphemes such as ordinary nouns, adjectives and verbs and (b) functional morphemes such as conjunctions, prepositions, articles and pronouns. Bound morphemes are subcategorized into derivational and inflectional (Yule, 2004).

The term lexical item is introduced by McCarthy (2002) as words that have meanings that are unpredictable and so must be listed in dictionaries. A word need not be a lexical item. There are some words that are not isted in dictionaries. In his book, McCarthy gives an illustrations from some sentences:

(1) This pianist performs in the local hall every week.

(2) Mary told us that this pianist performed in the local hall every week.

(3) The performance last week was particularly impressive.

All these words contain a suffix: *perform-s, perform-ed,* and *perform-ance*. However, the suffixes *–s* and *–ed* are dependent on a grammatical context in a way that the suffix *–ance* is not.

Futhermore, Norman Segalowiz (2003) have suggested that during second language acquisition, "learners have to pay attention at first to any aspect of the language that they are trying to understand or produce by using cognitive resources to process information". However, Lightbown and Spada have argued that there is a limitation to the amount of information a learner can pay attention to. That is, while learners at the earliest stage concentrate more on understanding the main words of the message, they may not pay attention to the grammatical morphemes attached to some of the words that do not affect the meaning. Consequently, with practice, those words become automatically used by the learners.

4. Syntax

Chomsky in Fromkin (2000) says that the grammar of the language determines the properties of each of the sentences of the language. The language is a set of sentences that are described by the grammar. The grammar 'generates' the sentences it describes and their structural description. When we speak of the linguist's grammar as a 'generative grammar', we mean only that it is sufficiently explicit to determine how sentences of the language are in fact characterized by the grammar.

This explanation shows that Chomsky views grammar as a structural description. Fromkin adds that knowing a language includes the ability to put words together to form phrases and sentences that express our thoughts. This would require one's knowledge upon structure of the sentence and words order. It is acknowledged that word order might change the meaning of a sentence, for example

Salome danced for Herod.
does not have the same meaning as

Herod danced for Salome.

The study of syntax reflects speaker's knowledge of these facts.

In English and in every language, every sentence is a sequence of words, but not every sequence of words is a sentence. Sequences of words that conform to the role of syntax are said to be well formed or grammatical and those which violate the syntactic rules are therefore ill formed and ungrammatical (Fromkin, 1983).

Moreover, Fromkin defines that a sentence is syntactically well-formed when it is at lest account for:

1. the grammatically of sentence
2. word order
3. structural ambiguity
4. the meaning relation between words in a sentence
5. the similarity of meaning of sentences with different structures

speaker's creative ability to produce and understand any of an infinite set of possible sentences and is represented by a 'tree diagram' explaining the deep structure of a sentence, which refer to the deep analysis of structure despite the surface structure or the structure which is represented in the sentence.

The sentence is, then, classified in Noun (N) and Verb (V). The classification can be in the form of phrases of Noun Phrase (NP) and Verb Phrase. The syntactical rules of this 'diagramming" has three aspects of speaker's syntactic knowledge of sentence structure and are disclosed in phase structure trees:

1. the linear order of the words in the sentence
2. the groupings of words into syntactic categories
3. the hierarchical structure of the syntactic categories (e.g. a sentence is made up of a Noun Phrase followed by a Verb Phrase, a verb Phrase may be composed of a Verb followed by a Noun Phrase, and so on).

5. English for Specific Purposes

Notably, there are three reasons common to the emergence of all ESP: the demands of a Brave New World, a revolution in linguistics, and focus on the learner (Hutchinson & Waters, 1987).

Strevens defines ESP by identifying its absolute and variable characteristics. Strevens' definition (1988) makes a distinction between four absolute and two variable characteristics:

I. Absolute characteristics:

ESP consists of English language teaching which is:

▪ designed to meet specified needs of the learner;

▪ related in content (i.e. in its themes and topics) to particular disciplines, occupations and activities;

▪ centered on the language appropriate to those activities in syntax, lexis, discourse, semantics, etc., and analysis of this discourse;

▪ in contrast with General English.

II. Variable characteristics:

ESP may be, but is not necessarily:

▪ restricted as to the language skills to be learned (e.g. reading only);

▪ not taught according to any pre-ordained methodology.

Dudley-Evans and St John (1991) modifies Strevens' original definition of ESP to form their own. The revised definition is as follows:

I. Absolute Characteristics

▪ ESP is defined to meet specific needs of the learner;

▪ ESP makes use of the underlying methodology and activities of the discipline it serves;

▪ ESP is centered on the language (grammar, lexis, register), skills, discourse and genres appropriate to these activities.

II. Variable Characteristics

▪ ESP may be related to or designed for specific disciplines;

▪ ESP may use, in specific teaching situations, a different methodology from that of general English;

▪ ESP is likely to be designed for adult learners, either at a tertiary level institution or in a professional work situation. It could, however, be for learners at secondary school level;

▪ ESP is generally designed for intermediate or advanced students;

▪ Most ESP courses assume some basic knowledge of the language system, but it can be used with beginners.

Dudley-Evans and St. John have removed the absolute characteristic that 'ESP is in contrast with General English' and added more variable characteristics. They assert that ESP is not necessarily related to a specific discipline.

Dudley Evans and St. John (1991) identify five key roles for the ESP practitioner:

- teacher

- course designer and materials provider
- collaborator
- researcher
- evaluator.

It seems fairly obvious that if teachers are to be the ones responsible for developing the curriculum, they need the time, the skills and the support to do so. Support may include curriculum models and guidelines and may include support from individuals acting in a curriculum advisory position. The provision of such support cannot be removed and must not be seen in isolation, from the curriculum (Nunan, 1987).

Nunan recognizes that issues of time, skills and support are key for teachers faced with the very real task of developing curricula. In the real world, many ESL instructors/ESP developers are not provided with ample time for needs analysis, materials research and materials development. There are many texts which claim to meet the needs of ESP courses. Johns (1990) comments that none ESP text can live up to its name. He suggests that the only real solution is that a resource bank of pooled materials be made available to all ESP instructors (Johns, 1990).

6. Error Analysis

Error analysis is an activity to reveal errors found in writing and speaking. Richards (1985:96) states that error analysis is the study of

errors made by the second and foreign language learners. Error analysis may be carried out in order to (a) find out how well someone knows a language, (b) find out how a person learns a language, and (c) obtain information on common difficulties in language learning, as an aid in teaching or in the preparation of teaching materials. This definition stresses the functions of error analysis.

Error analysis, offered as an alternative to Contrastive Analysis, has its value in the classroom research, whereas contrastive analysis, which may be least predictive at the syntactic level and at early stages of language learning (Brown 1994: 214), allows for prediction of the difficulties involved in acquiring a second language (Richards 1974: 172); error analysis emphasizing "the significance of errors in learners' interlanguage system" (Brown 1994: 204) may be carried out directly for pedagogic purposes (Ellis 1995: 51; and Richards et al. 1993: 127). The term interlanguage, introduced by Selinker in Brown (1994) is conceptualized as "a system that has a structurally intermediate status between the native and target languages."

Brown (1994: 207-211) and Ellis (1995: 51-52) give a detailed account of and exemplify a model for error analysis offered by Corder (1974). Ellis (1997-b: 15-20) and Hubbard et al. (1996: 135-141) on the other hand, give practical advice and provide clear examples of how to identify and analyze learners' errors. The initial step requires the selection of a corpus of language followed by the identification of errors by making

a distinction between a mistake (i.e. caused by lack of attention, carelessness or some aspect of performance) and an error. The errors are, then classified as overt and covert errors (Brown 1994: 208). The next step after giving a grammatical analysis of each error, demands an explanation of different types of errors that correspond to different processes. Selinker (1974: 35) reports five such processes central to second language learning: "language transfer, transfer of training, strategies of second language learning, strategies of second language communication, and overgeneralization TL [Target Language] linguistic material ." In the literature, the studies related to the process of language transfer, and over-generalization have received considerable attention. Work on over-generalization errors, on the other hand, viewed as an excessive application of the generalization strategies within L2 by a learner in producing his/her language, is reported by Richards (1974), Jain (1974) and Taylor (1975).

Another concept of error analysis is given by Brown (1980:166). He defines error analysis as the process to observe, analyze, and classify the deviations of the rules of the second language and then to reveal the systems operated by learner. It seems that this concept is the same as the one proposed by Crystal (1987:112) who states that error analysis is a technique for identifying, classifying and systematically interpreting the unacceptable forms produced by someone learning a foreign language, using any of the principles and procedures provided by linguistics. The

three definitions above clarify that error analysis is an activity to identify, classify and interpreted or describe the errors made by someone in speaking or in writing and it is carried out to obtain information on common difficulties faced by someone in speaking or in writing English sentences.

7. Errors and Mistakes

Various definitions of error have been presented by experts. The two definitions which are adequate to reveal errors showing up in texts are (1) error is a systematic deviation, when a learner has not learned something and consistently gets it wrong, (Norrish, 1987:7) and (2) errors are systematic deviations from the norms of the language being learned (Cunningworth,1987:87). It seems that the phrase 'systematic deviation' in these definitions is a keyword which can be interpreted as the deviation which happens repeatedly.

A number of different categories for describing errors have been identified. Firstly, Corder (1973) classifies the errors in terms of the difference between the learners' utterance and the reconstructed version. In this way, errors fall into four categories: *omission* of some required element; addition of some unnecessary or incorrect element; selection of an incorrect element; and misordering of the elements. Nevertheless, Corder himself adds that this classification is not enough to describe errors. That is why he includes the linguistics level of the errors under the sub-areas of morphology, syntax, and lexicon (Corder, 1973). Brown

states further (1980:166) that on a rather global level, errors can be described as errors of addition, omission, substitution, and ordering, following standard mathematical categories. Within each category, levels of language can be considered: phonology or orthography, lexicon, grammar, and discourse.

Ellis (1997) maintains that "classifying errors in these ways can help us to diagnose learners' learning problems at any stage of their development and to plot how changes in error patterns occur over time." This categorization can be exemplified as follows:

Omission:

Morphological omission *A strange thing happen to me yesterday.

Syntactical omission * Must say also the names?

Addition:

In morphology * The book**s** is here.

In syntax * The London

In lexicon * I stayed there during five years ago.

Selection:

In morphology * My friend is old**est** than me.

In syntax * I want that he comes here.

Ordering:

In pronunciation * fignisicant for 'significant'; *prulal for 'plural'

In morphology * get upping for ‘getting up’

In syntax * He is a dear to me friend.

In lexicon * key car for ‘car key’

An error may vary in magnitude. It can include a phoneme, a morpheme, a word, a sentence or even a paragraph. Due to this fact, errors may also be viewed as being either global or local (cited in Brown, 2000)**.** Global errors hinder communication. They prevent the message from being comprehended as in the example below:

* I like bus but my mother said so not that we must be late for school.

On the other hand, local errors do not prevent the message from being understood because there is usually a minor violation of one segment of a sentence that allows the hearer to guess the intended meaning as follows:

* If I hear from her, I would let you know.

The final group is the two related dimensions of error, *domain* and *extent***.** Domain is the rank of linguistic unit from phoneme to discourse that must be taken as context in order for the error to be understood, and extent is the rank of linguistic unit that would have to be deleted, replaced, supplied or reordered in order to repair the sentence. This suggestion by Lennon (cited in Brown, 2000) is parallel with Corder’s other categorization of *overtly* and *covertly* (1973). Overt errors are unquestionably ungrammatical at the sentence level and covert errors are

grammatically well- formed at the sentence level but are not interpretable within the context of communication. For example, “I’m fine, thanks.” Is a correct sentence but if it is given as an answer to the question of “How old are you?” it is covertly error.

Brown (1980:173-181) classifies sources of error into, 1) interlingual transfer, that is the negative influence of the mother tongue of learner, 2) intralingual transfer, that is the negative transfer of items within the target language. In order words, the incorrect generalization of rules within the target language; 3) context of learning, which overlaps both types of transfer, for example, the classroom with its teacher and its materials in the case of school learning or the social situation in the case of untutored second language learning. In a classroom context, the teacher or the textbook can lead the learner to make wrong generalization about the language; 4) communication strategies. It is obvious that communication strategy is the conscious employment of verbal mechanisms for communicating an idea when linguistic forms are not available to the learner for some reasons. There are five main communication strategies, namely:

1) Avoidance

Avoidance can be broken down into several subcategories, and thus distinguished from other types of strategies. The most common type

of avoidance strategy is ‘syntactic or lexical avoidance’ within a semantic category. When a learner, for example, cannot say “I lost my way” he might avoid the use of way’ and says “I lost my road” instead.“Phonological avoidance’ is also common, as in the case of a learner of English who finds initial /I/ difficult to pronounce and wants to say “he is a liar” may choose to say” He does not speak the truth”. A more direct type of avoidance is “topic avoidance”, in which a whole topic of conversation is entirely avoided. To avoid the topic, a learner may change the subject, pretend not to understand, or simply not respond at all.

2) Prefabricated patterns

Another common communication strategy is to memorize certain stock phrases or sentences without understanding the components of the phrases or sentences. “Tourist survival” language is full of prefabricated patterns, most of which can be found in pocket bilingual “phrase” books which list hundred of stock sentences for various occasions. The examples of these prefabricated patterns are “How much does it cost?”, “Where is the toilet?”. “I don’t speak English” and “I don’t understand you”.

3) Cognitive and personality style

One’s own personality style or style of thinking can be a source of error, highlighting the idiosyncratic nature of many learner errors. A reflective and conservative style might result in very careful but hesitant

production of speech with perhaps fewer errors but errors indicative of the conscious application of rules. Such a person might also commit errors of over formality. A person with high self-esteem may be willing to risk more errors, in the interest of communication, because he does not feel as threatened by committing errors with a person with low self-esteem. In answer to "How did you get here?" a person might be heard to say, "I drove my bicycle" while another might say, "I pedaled my bicycle" in an attempt to be precise. Language errors can thus conceivably be traced to sources in certain personal or cognitive idiosyncrasies.

4) Appeal to authority

Another common strategy of communication is a direct appeal authority. The learner may directly ask a native speaker (the authority) if he gets stuck by saying, for example, "How do you say?" Or he might guess and then ask for verification from the native speaker of the correctness of the attempt. He might also choose to look a word or structure up in a bilingual dictionary.

5) Language Switch

Finally, when all other strategies fail to produce a meaningful utterance, a learner may switch to the so-called language switch. That is, he may simply use his native language whether the hearer knows that native language or not. Usually, just a word or two are slipped in, in the hope that learner will get the gist of what is being communicated.

Norrish (1987:21-26) classifies causes of error into three types that is carelessness, first language interference, and translation. The three types of causes of error will be discussed briefly below.

1) Carelessness

Carelessness is often closely related to lack of motivation. Many teachers will admit that it is not always the student's fault if he loses interest, perhaps the materials and/or style of presentation do not suit him.

2) First language

Norrish states that learning a language (a mother tongue or a foreign language) is a matter of habit formation. When someone tries to learn new habits, the old ones will interfere the new ones. These causes of error are called first language interference".

3) Translation

Translation is one of the causes of error. This happens because a student translates his first language sentence or idiomatic expression in to the target language word by word. This is probably the most common cause of error.

Another expert who discusses the sources of error is Richards. In an article in Schummann and Stenson (1978:32), he classifies sources of errors into (1) interference, that is an error resulting from the transfer of grammatical and/or stylistic elements from the source language to the

target language; (2) overgeneralization, that is an error caused by extension of target language rules to areas where they do not apply; (3) performance error, that is unsystematic error that occurs as the result of such thing as memory lapses, fatigue, confusion, or strong emotion; (4) markers of transitional competence, that is an error that results from a natural and perhaps inevitable development sequence in the second language learning process (by analogy with first language acquisition); (5) strategy of communication and assimilation that is an error resulting from the attempt to communicate in the target language without having completely acquired the grammatical form necessary to do so; and (6) teacher-induced error, that is an error resulting from pedagogical procedures contained in the text or employed by the teacher.

In another article, Richards (1971:19-22) classifies causes of error into 1) overgeneralization, 2) incomplete application of rules, 3) false concepts hypothesized, and 4) ignorance of rule restriction. To make it clear, the four classifications above are explained briefly below.

1) Overgeneralization

Overgeneralization generally involves the creation of one deviant structure in place of two regular structures, for examples, “He can sings”, “We are hope”, “it is occurs”.

2) Incomplete Application of Rules

An example of incomplete application of rules can be seen in the question forms. Very often they are used, not to find out something, as they should, but as a means of eliciting questions through a transform exercise.

The use of question may also be unrelated to the skills it is meant to establish.

Teacher's questions	Student's responses
Ask her how long it takes	How long it takes ?
How much does it cost?	It cost five dollar
What does he have to do?	He have to do write the address

3) False Concepts Hypothesized

False concepts hypothesized are something due to poor gradation of teaching items. The form 'was' for example, may be interpreted as the marker of the past tense, as in: "one day it was happened".

4) Ignorance of Rule Restriction

Closely related to the generalization of deviant structures is failure to observe the restriction of existing structures, that is, the application of rules to context where they do not apply. They man who I saw him violates the limitation on subjects in structure with who. This is again a type of generalization of transfer, since the learners is making use of previously acquired rule in a new situation.

Further, it is necessary to differentiate between error and mistake. A mistake is also a deviation of the norms of the language but is not systematic. It means that the use of the norms of the language in sentences is sometimes true and sometimes wrong. Norrish (1983:8) says that a mistake is an inconsistent deviation that is sometimes the learner 'gets it right' but sometimes wrong. Richards (1985:95) states that mistake is made by a learner when writing or speaking which is caused of lack of attention, fatigue, carelessness, or other aspects of performance. From these two definitions, it can be concluded that a mistake is made by a learner because he does not apply the rule(s) that he actually knows, in other words, a mistake is a non systematic deviation from the norms of the language.

Richards (1992) stated that a learner makes a mistake when writing or speaking because of lack of attention, fatigue, carelessness, or some other aspects of performance. Mistakes can be self-corrected when attention is called, whereas an error is the use of linguistic item in a way that a fluent or native speaker of the language regards it as showing faulty or incomplete learning. In other words, it occurs because the learner does not know what is correct, and thus it cannot be self-corrected. To distinguish between an error and mistake, Ellis (1997) suggests two ways. The first one is to check the consistency of learner's performance. If he sometimes uses the correct form and sometimes the wrong one, it is a

mistake. However, if he always uses it incorrectly, it is then an error. The second way is to ask learner to try to correct his own deviant utterance. Where he is unable to, the deviations are errors; where he is successful, they are mistakes.

8. Teaching Materials

Materials could obviosly be cassettes, videos, CD-Roms, dictionaries, grammar book, readers, workbooks, or photocopied exercises. They could also be newspapers, food packages, photographs, live talks by invited natives speakers, instructions given by a teacher, tasks written on cards, or discussion between learners. In other words, they can be anything which is deliberately used to increase the learner's knowedge and/or experience of the language (Tomlinson, 1998). Later, Tomlinson mentions that materials should have some characteristics in order to be a good material.

Here are some characteristics of the materials that he mentioned:

- Materials should achieve impact,
- Materials should help learners to feel at ease,
- Materials should help learner to develop confidence,
- Materials should require and facilitate learner self-investment,
- Materials should expose the learners to language in authentic use,

- Materials should provide the learners with opportunities to use the target language to achieve communicative purposes,
- Materials should take into account that the positive effects of instructions are usually delayed,
- Materials should take into accounts that learners differ in learning styles,
- Materials should take into accounts that learners differ in affective attitudes,
- Materials should permit a silent period at the beginning of instruction,
- Materials should maximise learning potential by encouraging intellectual, aesthetic and emotional involvement which stimulates both right and left brain activities,
- Materials should not rely too much on controlled practice, and
- Materials should provide opportunities for outcome feedback.

9. About Mathematics Bilingual Media for Grade Eight Developed by the Directorate of Development of Junior High School, Directorate General of Management of Basic and Junior Education, Ministry of National Education

The material developed by Directorate General of Management of Basic and Junior Education is a computer-based media. It is in the form of *flash player*. There are seven chapters in the media consist of materials based on national curriculum, which are *Polyanomials, Function and Relation, Straight Line Equation, System of Linear Equation with two Variables, Phytagorean Theorem, Circle, and Cube and Cuboids*. Each chapter is presented in two languages which are Bahasa Indonesia and English. The materials are delivered spoken and in written text. Students can easily switch to English and *Bahasa Indonesia* using the menu.

B. Revelant Studies

Many studies have been conducted on error analysis. Mohideen (1991) conducted an error analysis in the written English. He reviewed the current literature on factors that contribute to errors in written English and contributed the subject of error analysis by identifying and discussing additional contributory factors. Error analysis in terms of grammar was conducted by Hashemi (2003) in order to know the distribution of error types in students' writings. In terms of translation, Al-Jarf (2000) described grammaical agreement errors.

C. Conceptual Framework and Analytical Construct

1. Conceptual Framework

In developing bilingual media for mathematics, the theory of English for Specific Purposes needs to be taken into account. When the developer of the media is someone who knows mathematics and not English, errors related to the language used in the media might occur. Errors occurring in the media can be analyzed using theories of error analysis. The analysis was focused on the grammatical errors since English for Specific Purposes is centered on the language (grammar, lexis, register), besides skills, discourse and genres appropriate.

Following this, the researcher analyzed grammatical errors in the media by classifying errors into overt and covert errors. The errors were listed and classified into four categories: omission of some required elements, addition of some unnecessary element, selection of an incorrect element, and misordering of the elements. Following this theory, linguistic level was included to describe errors and it is stated that error can occur under the sub areas of morphology, syntax, and lexicon. The theory gave more detailed information on what level the errors occurred in the media.

After the errors were identified, the causes of errors were determined by the researcher using theories on the causes of errors.

Hence, the researcher classified causes of errors into interlingual transfer, intralingual transfer, context of learning, and communication strategies. Communication strategies were described into avoidance, prefabricated pattern, appeal to authority, cognitive and personality style, and language switch. This theory is applicable in the written texts and therefore best described the causes of errors in the media.

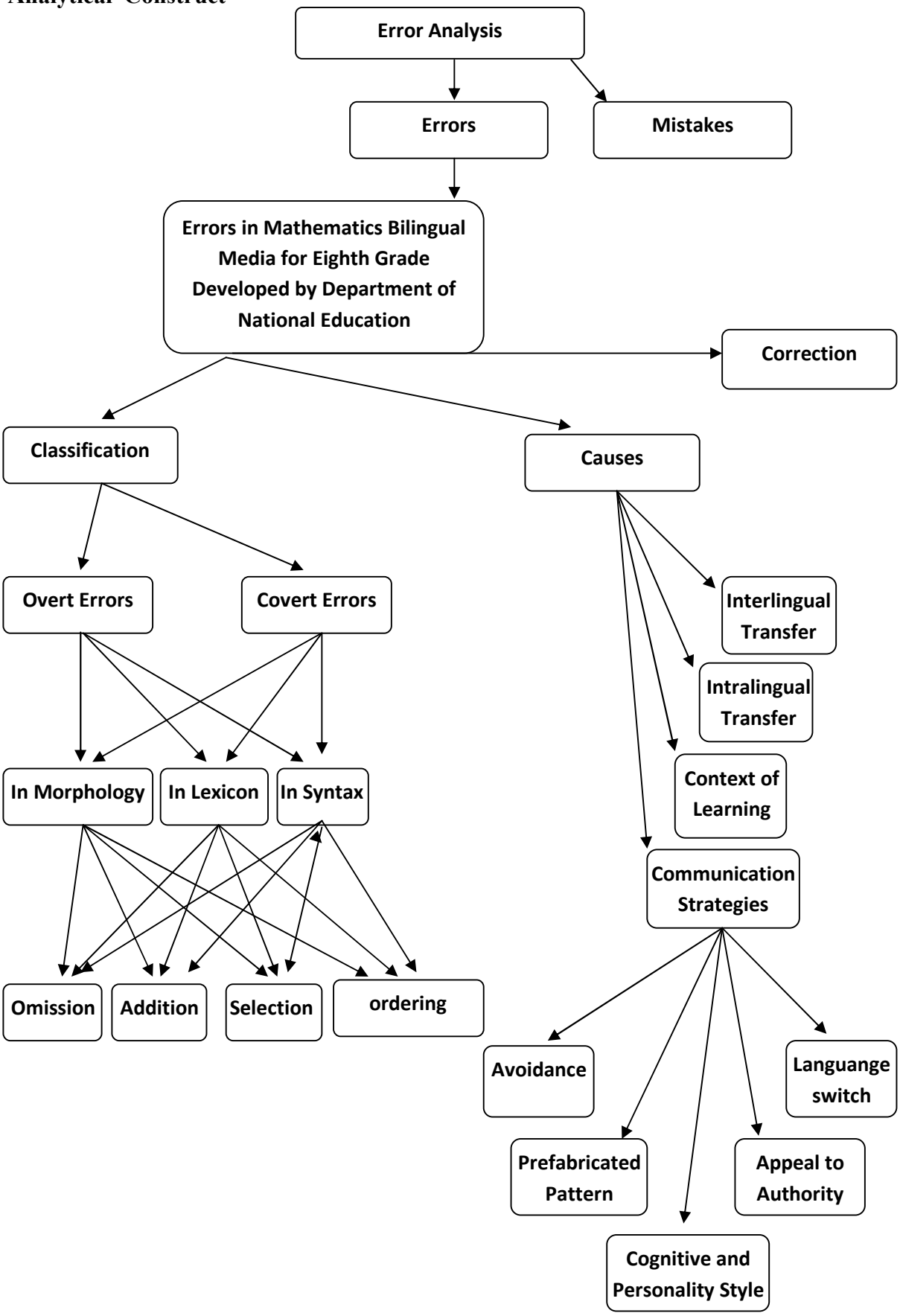
It was difficult to differentiate between errors and mistakes in the media since the researcher could not ask to do self-correction to the media. The standard of 'sometimes right and sometimes wrong' could not be defined into exact number or precentage. Therefore, both errors and mistakes in the media were termed *errors*.

2. Analytical Construct

The aims of this research were to classify the errors found and to find the causes of the errors found. Firstly, the researcher wrote the text into data sheets and considered them as a research data. After that, the researcher recorded them in the data analysis. The analysis result were classified into tabes of percentages before they were valued.

Below is the diagram of the analytical construct:

Analytical Construct



CHAPTER III

RESEARCH METHOD

A. Type of Research

This research was about grammatical errors in Mathematics English terms used in a bilingual Mathematics media. The sentences in the media were transcribed to search for the errors. The errors were overtly and covertly analyzed and classified in order to find the causes. Then, the corrections were provided.

The research applied content analysis method which analyzed the data more deeply, and was combined with the theory to get the best result of the research. According to Krippendorf (1980: 21), content analysis is a research technique for making replicable and valid inferences from data to their content. As a research technique, content analysis involves specialized procedures for processing scientific data. Its purpose is to provide information, new insights, a representation of facts, and a practical guide to action (Krippendorff, 1980: 21).

B. Data Type

Since the unit analysis of this research was in flash player, the data were converted into texts through slides. Each slide contained a text, which was evaluated in terms of its grammatical accuracy. The text contained phrases, clauses, sentences, and or the combination of these three.

C. Data Source

The source of the data was the bilingual mathematics media for Grade Eight Developed by The Directorate of Development of Junior High School, Directorate General of Management of Basic and Junior Education, Ministry of National Education and Culture. The texts were gathered from units 1-7 of mathematics lessons discussed in the media. Those data were taken from converting the media into slides.

D. Data Collection

The texts in the media were read and written in a data sheet. After the data were gained, they were classified and analyzed using both qualitative and quantitave methods. Literature review was employed in analyzing the data in order to get valid and constant data. The errors found were classified and the causes of the errors were identified. Then, the corrections for the errors found were provided.

E. Research Instrument

The key instrument of this research was the researcher himself.. The table sheets and related references as the research instruments were used to classify the data.

F. Trustworthiness

Krippendorf (1980: 129-131) defines reliability as how far the research design and the research data reflect the variation in the real phenomena. He points out that there are three kinds of reliability: *stability, reproducibility,* and *accuracy*.

Further, Krippendorf (1980) states that validity refers to how far the results of the study achieve empirical truth, predictive accuracy, or consistency with established knowledge. He classifies three types of validity: *data related validity, product oriented validity,* and *process oriented validity*. Then, the data related validity is divided again into two kinds: *semantical validity* and *sampling validity*.

This study applied the accuracy to measure the degree of reliability. The data were analyzed repeatedly by the researcher and she stopped analyzing when she was sure that her analysis was accurate. The data were presented as clearly as possible to gain validity. The result of the data analysis was discussed by the researcher with her consultants and her colleagues to fulfill the reliability and validity of the research study.

G. Data Analysis

After the data had been collected by the researcher, the data were classified based on the parameter. The general steps in analysis are:

1. rewriting the texts into data sheet,
2. analyzing the data in terms of grammatical,
3. recapping the data result in the statistic table of the data,
4. conducting a literature study upon the data,
5. describing the data in the table into words, and
6. drawing the conclusion.

CHAPTER IV

FINDINGS AND DISCUSSION

A. Descriptive Findings

Descriptive findings and valuing contain the result of data analysis, which is in the form of numbers and percentages. It covers the recappitulation of types of errors, their causes, and the number of alternative corrections proposed. Here is the detailed explanation.

1. The Description of Errors Occurring in Mathematics Bilingual Media

The errors occurring in the media were classified into two main types which were overt error and covert error. When a sentence was ungrammatical, it was classified into overt error. When a sentence was grammatical but not correct, it was classified into covert error. Below are the numbers of overt and covert errors.

Table 1. Errors Occurring in the Media

Classification	Number	Percentage
Overt errors	259	69.1%
Covert errors	116	30.9%
Total	**375**	**100%**

The table shows that there are 375 cases of errors occurring in the media; consisting of 259 cases of overt errors or 69.1% and 116 cases of covert errors or 30.9%. It means that the media still need some corrections.

a. Overt Errors Occurring in the Media

There were 259 cases of overt errors which consisted of omission, addition, selection, and ordering. Omission is the error occuring when an element is missing in the phrases and or sentences. Addition is the error occuring when unnecessary element is added in the phases and or sentences. Selection is the error occuring when the element selected is not correct. Ordering is the error occuring when the order of an element is not correct. Omission, addition, selection, and ordering errors in the media occured in morphological level, lexical level, and syntactical level.

Table 2. Overt Errors Occurring in the Media

Omission			Addition			Selection			Ordering		
M	L	S	M	L	S	M	L	S	M	L	S
38 (10.1%)	51 (13.6%)	8 (2.1%)	22 (5.9%)	43 (11.6%)	2 (0.6%)	4 (1.0%)	75 (20%)	5 (1.3%)	6 (1.6%)	1 (0.3%)	4 (1.0%)

The table shows the percentage of overt errors occurring in the media. Of all the total numbers of errors, the total number of overt error is 259 or 69.1%. The details are 38 cases of omission in morphology or 10.1%, 51 cases of omission in lexicon or 13.6%, 8 cases of omission in syntax or 2.1%, 22 cases or addition in morphology or 5.9%, 43 cases of addition in lexicon or 11.6%, 2 cases of addition in syntax or 0.6%, 4 cases of selection in morphology or 1%, 67 cases of selection in lexicon or 20%, 5 cases of selection in syntax or 1.3%, 6 cases of ordering in morphology

or 1.6%, 1 cases of ordering in lexicon or 0.3%, and 4 cases of ordering in syntax or 1%

b. Covert Errors Occurring in the Media

The covert errors occurring in the media were similarly classified with overt error's classification. There were 116 cases of covert errors which consisted of omission in morphology, omission in lexicon, addition in morphology, addition in lexicon, addition in syntax, selection in morphology, selection in lexicon, selection in syntax, ordering in morphology, ordering in lexicon, and ordering in syntax. There was no case of omission in syntax and selection in morphology found. The details will be shown in the table.

Table 3. Covert Errors Occurring in the Media

Omission			Addition			Selection			Ordering		
M	**L**	**S**	**M**	**L**	**S**	**M**	**L**	**S**	**M**	**L**	**S**
54 (14.2%)	**4 (1.0%)**	**0 (0%)**	**3 (0.8%)**	**12 (3.1%)**	**9 (2.4%)**	**0 (0%)**	**17 (4.4%)**	**8 (2.2%)**	**6 (1.6%)**	**2 (0.6%)**	**2 (0.6%)**

The table shows the percentage of covert errors occurring in the media. Over the total numbers of errors, the total number of covert error is 116 or 30.9%. The details are 54 cases of omission in morphology or 14.2%, 4 cases of omission in lexicon or 1%, 0 case of omission in syntax or 0%, 3 cases of addition in morphology or 0.8%, 12 cases of addition in lexicon or 3.2%, 9 cases of addition in syntax or 2.4%, 0 case of selection in morphology or 0%, 17 cases of selection in lexicon or 4.4%, 8 cases of

selection in syntax or 2.2%, 6 cases of ordering in morphology or 1.6%, 2 cases of ordering in lexicon or 0.6%, and 2 cases of selection in syntax or 0.6%.

2. The Description of Causes and Corrections of the Errors

a. Causes of the Errors

There are some factors that can cause one create an error. In this media, the causes of errors were defined in four major types, which were interlanguage, intralanguage, context of learning, and communication strategies. Interlanguage relates to the negative influence of one's mother language. Intralanguage relates to the negative influence of the second language learnt, or overgeneralization of rules by the speaker. Context of learning relates to the way one learns the second language, for example the lack of material or the lack of teacher's attention. Communication strategies are strategies applied in communicating in the second language. The strategies are mainly avoidance, or avoiding using certain elements of the second language, prefabricated pattern or memorizing a stock of phrases or sentences without understanding them, cognitive and personality style which is the way of thinking, appeal to authority or asking native speakers in attempts of correction, and language switch, which is switching into one's mother language, usually a word or phrase.

Here is the detail of the causes and their values in percent.

Table 4. Causes of Errors

Interlingual Transfer	Intralingual Transfer	Communication Strategies				
		Avoidance	Prefabricated Pattern	Cognitive and Personality Style	Appeal to authority	Language Switch
48 (12.8%)	275 (73.3%)	0 (0%)	0 (0%)	37 (9.9%)	0 (0%)	15 (4.0%)

There were 375 causes of errors in total with the details of 48 interlingual causes or 12.8%, 275 intralingual causes or 73.3%, 37 cognitive and personality style causes or 9.9%, and 15 language switch causes or 4.0%.

Avoidance, prefabricated pattern, and appeal to authority causes were not found in the media since these causes will be easier to recognize in real spoken conversation rather than in written expressions.

b. Corrections for the Errors

Corrections for the errors were proposed by the researcher in order to correct the errors found in the media. From the total of 2334 items, there were 375 errors found in the media. Thus, 375 items or 16.1% needed grammatical correction.

B. Explanatory Findings and Discussion

1. Overt Errors Occurring in the Media

The details of overt errors occurring in the media will be discussed below.

a. Omission in Morphology

There were 38 cases of omission overt errors in morphology found in the media or 10.1%. Below are the examples of the errors in the media.

- *A **Polynomials contain** two terms is called a binomial **where as** a polynomial containing three terms is called a trinomial.*
- *So, the **factor** of 12 are 1, 2, 4, 6, and 12*

In the first sentence, the word *contain* does not agree with the sentence. In order to agree, the word *contain* should be in its –ing form or *containing.* The –ing element is missing in the morpheme *contain*. Other errors found in the sentence are *polynomials,* in which it should be in its singular form; and *where as,* in which it should be re-ordered into *whereas*.

In the second sentence, the morpheme *factor* is not correct because it refers to more than one nouns. Thus, it should be *factors.*

b. Omission in Lexicon

There were 51 cases of omission overt errors in lexicon in the media or 13.6%. Below are the examples of the errors in the media.

- *Line EF descends the right.*
- *Choose two different pairs example points E (3,5) and F (-1, 3)*

The first sentence is not grammatcally correct because it needs a preposition. The sentence should be: *Line EF descends **to** the right*.

In the second sentence, the word *example* should be followed by *for*, so that: *Choose two different pairs, **for** example points E (3, 5) and F (-1, 3).*

c. Omission in Syntax

There were 8 cases of omission overt errors in syntax or 2.1%. Below are the examples of the errors.

- *Example: **straight line k parallel to a straight line l is** y = 2x + 3.*

The sentence does not make any sense in English grammar. The sentence should be: ***The equation of** straight line k **which is** parallel to a straight line l is y = 2x + 3.*

d. Addition in Morphology

There were 22 cases of addition overt errors in morphology or 5.9%. Below are the examples of the errors.

- *Do you still remember coefficient, variable, constant, terms, exponent of variable and like terms in **Algebraic**?*
- *A line will **intersection** x- axis if y = 0.*

In the first sentence, the word **algebraic** should be **algebra** in order to make the sentence grammatically correct, so that the sentence becomes: *Do you still remember coefficient, variable, constant, terms, exponent of variable and like terms in **Algebra**?*

The second sentence needs verb after the modal *will* instead of noun. The word **intersection** should be **intersect**, so that: *A line will* ***intersect*** *x- axis if y = 0.*

e. Addition in Lexicon

There were 43 cases of addition overt errors in lexicon in the media or 11.6%. Below are the examples of the errors.

- *The region inside a circle* ***which*** *is bounded by two radiuses and an arc of the circle.*
- *Because* ***of*** *every member of set A is related to the member of set B, and every member of set A has only one partner in set B, so that the relation between set A and set B is called function or mapping.*

The first sentence makes no sense because when the word **which** is added to it, it forms a phrase, not a complete sentence. When the word **which** is eliminated from the sentence, it forms a grammaticlly correct sentence: *The region inside a circle is bounded by two radiuses and an arc of the circle.*

The phrase **because of** should be followed by a noun instead of a phrase. In order to be grammatically correct, the word **of** in second sentence should be eliminated, so that: *Because every member of set A is related to the member of set B, and every member of set A has only one partner in set B, so that the relation between set A and set B is called function or mapping.*

f. Addition in Syntax

There were 2 cases of addition overt errors in syntax or 0.6%. Below is one of the examples of the errors.

- *On the chords PQRS of the rectangle* ***on the rectangle*** *on the right figure,* ***given*** *P = 83 and Q = 27.*

In the sentence, there is a repetition of the phrase **on the rectangle**. In order to form a grammatically correct sentence, the phrase should be eliminated, so that: *On the chords PQRS of the rectangle on the right figure, P = 83 and Q = 27.*

On the other hand, the word **given** should also be eliminated.

g. Selection in Morphology

There were 4 cases of selection overt errors in morphology in the media or 1.0%. Below is one of the examples of the errors.

- ***koefficient*** *a^2, ab, b^2 is 1, 2, 1.*

In the sentence, the word **koefficient**, which is not an English word, is selected instead of **coefficient**. In order to make the sentence grammaticaly correct, the word should be in English and adjusted in the sentence, so that: ***coefficients*** *of* a^2, ab, b^2 are 1, 2, 1.

h. Selection in Lexicon

There were 75 cases of selection overt error in lexicon in the media or 20.0%. Below is one of the examples of the errors.

- *Type your name,* ***than*** *press the enter button.*

In the sentence, the word **than** is selected. Thus, the sentence makes no sense since it does not show any comparisons. The word **then** should be selected instead, so that: *Type your name, **then** press the enter button.*

i. Selection in Syntax

There were 5 cases of selection overt errors in syntax in the media or 1.3%. Below is one of the examples of the errors.

- ***It's** perimeter is 240 m*.

The phrase **it's** is selected so that the sentence has double verbs. The phrase **it's** should be replaced with **its** so that: ***Its** perimeter is 240 m*.

j. Ordering in Morphology

There were 6 cases of ordering overt errors in morphology in the media or 1.6%. Below is one of the examples of the errors.

- *The area of it's base is 10m^2 width 2 m and **heigth** 3 m.*

The word **heigth** is missordered. The correct order should be **height**, so that: *The area of its base is 10m^2 width 2 m and **height** 3 m.*

k. Ordering in Lexicon

There was 1 case of ordering overt errors in lexicon in the media or 0.3%. Below is the example of the error.

- *Haris has a **car toy.***

In the sentence, there is a missordering in the phrase **car toy**. The correct order should be **toy car**, so that: *Haris has a **toy car***.

l. Ordering in Syntax

There were 4 cases of ordering overt errors in syntax found in the media or 1.0%. Below is one of the examples of the errors.

- *In the following equations **and determine which equations one linear equations with two variables.***

The sentence needs to be revised into: ***in the following equation, determine which ones are linear equations with two variables.***

2. Covert Errors Occurring in the Media

The details of covert errors occurring in the media will be discussed below.

a. Omission in Morphology

There were 54 cases of omission covert errors in morphology in the media or 14.2%. Below is one of the examples of the errors.

- *Kids **play** drum band.*

The sentence is used as the title for a video in the media. In such context, the sentence should be: *Kids **playing** drum band*.

b. Omission in Lexicon

There were 4 cases of omission covert errors in lexicon in the media or 1.0%. Below are the examples of the errors.

- *So, the three points are on the straight line.*

The sentence misses the word **same** since the context of the sentence in the media is two show that the two lines are on the same line which is straight. The sentence should be: *So, the three points are on the **same** straight line.*

c. Addition in Morphology

There were 3 cases of addition covert errors in morphology in the media or 0.8%. Below is one of the examples of the errors.

- *What is the **relationship** between kid and drum band?*

The term in math is **relation**. The sentence should be: *What is the **relation** between kid and drum band?*

d. Addition in Lexicon

There were 12 cases of addition covert errors in lexicon in the media or 3.1%. Below is one of the examples of the errors.

- *If R = 10 cm, and OB = 20 cm, **then** the tangent of AB are...*

In *if-clauses* like this sentence, the word **then** is not necessary. In the media, the word **then** is used in almost all similar cases of *if-clauses*. The sentence should be: *If R = 10 cm, and OB = 20 cm, the tangent of AB are ...*

e. Addition in Syntax

There were 9 cases of addition covert errors in syntax in the media or 2.4%. Below is one of the examples of the errors.

- *P = {1, 2} and Q = {a, b, c} **are known.***

In the sentence, the addition of phrase **are known** is not necessary. The sentence should be: *P = {1, 2} and Q = {a, b, c}***.**

f. Selection in Lexicon

There were 17 cases of selection covert errors in lexicon in the media or 4.4%. Below are the examples of the errors.

- ***How*** *is the taste of salt?*

The word **how** is selected as the question when to ask about the taste of salt instead of the word **what**. The sentence should be: ***What*** *is the taste of salt?*

g. Selection in Syntax

There were 8 cases of selection covert errors in syntax in the media or 2.2%. Below is one of the examples of the errors.

- *Arel and Hanif* ***played*** *Trio Drum.*

The context for the first sentence in the media is the title of a video showing kids playing trio drum. Thus, the tense used in the sentence is not correct. The sentence should be: *Arel and Hanif* ***are playing*** *trio drum.*

h. Ordering in Morphology

There were 6 cases of ordering covert errors in morphology in the media or 1.6%. Below is one of the examples of the errors.

- *Nia and her friends have different* ***kinsd*** *of favorite food.*

The sentence is grammatically correct. However, the word **kinds** is not correctly ordered. It should be re-ordered into **kinds** so that the sentence beomes:

*Nia and her friends have different **kinds** of favorite food.*

i. Ordering in Lexicon

There were 2 cases of ordering covert errors in morphology in the media or 0.6%. Below is one of the examples of the errors

- *Airplane and **baloon s** are air transportation and water transportation is such as ship*

The sentence is grammatically correct. However, the word **balloon s** is not correctly ordered. It should be re-ordered into **balloons**, so that the sentence beomes:

*Airplane**s** and **balloons** are air transportation and water transportation is such as ship.*

j. Ordering in Syntax

There were 2 cases of ordering covert errors in syntax in the media or 0.6%. Below is one of the examples of the errors.

- *Which is **the function of range?***

There is nothing wrong in the sentence except for that the sentence should ask about the range of the function, not the function of the range. The sentence should be:

*Which is **the range of the function?***

Errors found in the media were classified in omission overt error in morphology, in lexicon, and syntax; addition overt error in morphology, lexicon, and syntax; selection overt error in morphology, lexicon, and syntax; ordering overt error in morphology, lexicon, and syntax; omission covert error in morphology and lexicon; addition covert error in morphology, lexicon and syntax; selection covert error in lexicon and syntax; and ordering covert error in morphology and syntax.

Some of the biggest number of errors found in the media were omission overt error in lexicon, selection overt error in lexicon, and omission covert error in morphology.

3. Errors Not Occurring in the Media

There were two types of errors which were not found in the media. They were omission covert error in syntax and selection covet error in morphology. They were not found because the media consists of explanatory sentences, not conversations. Thus, incorrect replies or speech acts were not found.

4. The Causes of Errors in the Media

There were four main causes of error occurring in the media that were found. The classification of these causes were

interlanguage, intralanguage, and communication strategies which were explained as cognitive and personality style, and language switch.

a. Interlanguage

Some examples of errors caused by interlanguage are:

- ***How*** *is the taste of the salt?*
- *P = {1, 2} and Q = {a, b, c}* ***are known.***
- *Lesson in the national test.*

  The three sentences make natural sentences when they are translated word per word into Bahasa Indonesia. Thus, they receive bad influence from the first language. English speaking peple will say the sentences as:

  - ***What*** *is the taste of the salt?*
  - *P = {1, 2} and Q = {a, b, c}*
  - ***Subject*** *in the national e****xamination***

b. Intralanguage

Some examples of errors caused by intralanguage are:

- *Type your name, than press the enter button.*
- *Fill the blank correctly!*
- *How many mapping can be made from set P to set Q?*

  We can see that the three sentences are not grammatically correct. This errors happen repeatedly,

leading to a conclusion that the writer got bad influence from the target language. Or, in other word, over-generalize the rule.

c. Communication Strategies

In the media, errors caused by communication strategies were classified into cognitive and personality style; and language switch.

1. Cognitive and Personality Style

Some examples of errors caused by cognitive and personality style are:

- **Dtermine** the coordinate of the point of intersection on S axis
- **Lenght** of stairs base (1) ≠ **lenght** of stairs base (2)
- *Determining **thr** gradient by counting units.*

  There are some errors which seem to occur in the three sentences. The errors only happen once and it looks like his/her cognitive and personality style drives the media maker to produce such errors.

2. Language Switch

Some examples of errors caused by language switch are:

- The simplest form of $(x-y)^2 - (x-y)^2$ **adalah…**
- Rule of relation: **transportasi** means
- Line AB parallel with line NO **maka**

It is obvious that the media maker switches into his/her first language, in this case, Bahasa Indonesia in producing the sentence.

The errors caused by contextual learning and other communication strategies of avoidance, prefabricated pattern and appeal to authority were not found. Errors caused by contextual learning in the media were not found since it was hard to gain information on the context of learning of which the writer of the media had. Errors caused by avoidance, prefabricated pattern and appeal to authority were no found since they are usually found in daily conversation.

5. Correting Errors Found in the Media

There were 375 corrections made by the researcher. In alternative corrections, the errors found were corrected based on the error. The errors were corrected based on the classifications of errors and the causes of errors determined in the analysis. Here are some examples of correct sentences as corrections proposed by the researcher.

a. Correcting Omission Errors

In the occurring omission errors, the sentences were read and the missing elements are identified. The correct mophemes,

lexems, and words and or phrases were added into the sentences. In covert errors, the context are studied before determining whether the sentences are correct or not.

b. Correcting Addition Errors

In the occurring addition errors, the sentences were read and the unnecessary elements were identified. The unnecessary elements were eliminated. The elements could be in the forms of morphemes, lexemes, and or phrases. In covert errors, the context were studied before determining whether the sentences are correct or not.

c. Correcting Selection Errors

In the occurring selection errors, the sentences were read and the selection of morphemes, lexems, and phrases were judged to be proper or not. When there was an unproper choice of morphemes, lexems, and or phrases, the proper ones were selected to replace them. In covert errors, the contexts were studied before determining whether the sentence is correct or not.

d. Correcting Ordering Errors

In the occurring ordering errors, the sentences were read and the ordering of morphemes, lexemes, words and or phrases were judged. The unordered morphemes, lexems, words and or phrases were re-ordered. The contexts were read before determining whether the sentence was correct or not.

Another thing which helped in correcting errors found in the media was the causes of the errors. After the types of errors were identified, the causes of errors were analyzed in order to produce the corrections. The causes of errors in the media were interlanguage transfer, intralanguage transfer, cognitive and personality style, and language switch.

e. Correcting Errors Caused by Interlanguage Transfer

Errors caused by intralanguage transfer found in the media were mostly covert errors. They were sentences which were grammatically correct but were not natural. The bad influence of Bahasa Indonesia showed in terms of the translation so that errors occured. In the occurring errors caused by interlanguage transfer, researcher translated the sentences into Bahasa Indonesia in order to understand what the media's developer attempted to convey, before replacing the improper items and or revising the sentences.

The example of error caused by interlingual transfer is:

- *On the chords PQRS of the rectangle **on the rectangle** on the right figure, **given** P = 83 and Q = 27.*

The correction is:

- *On the chords PQRS of the rectangle on the right figure, P = 83 and Q = 27.*

f. Correcting Errors Caused by Intralanguage Transfer

Errors caused by intralanguage found in the media occured because of the media's developer over-generalization of English grammar. Thus, the errors were overt errors. They needed the correct rule of English grammar. In the occurring errors caused by intralanguage transfer, the researcher applied the correct English grammar rule for each sentence.

The example of error caused by intralingual transfer is:

- *A Polynomials **contain** two terms is called a binomial whereas a polynomial containing three terms is called a trinomial.*

The correction is:

- *A Polynomial **containing** two terms is called a binomial whereas a polynomial containing three terms is called a trinomial.*

g. Correcting Errors Caused by Cognitive and Personality Style

Errors caused by cognitive and personality style found in the media occured because the developer of the media was not aware of what he or she wrote. The errors occured in the form of mistypings. In the occurring errors caused by cognitive and

personality style, researcher checked the sentences and corrected the mistypings.

The example of error caused by cognitive and personality style is:

- *Nia and her friends have different **kinsd** of favourite food.*

The correction is:

- *Nia and her friends have different **kinds** of favourite food.*

h. Correcting Errors Caused by Language Switch

Errors caused by language switch were obvious. The media's developer suddenly used Bahasa Indonesia in the sentences. In the media, developer switched to Bahasa Indonesia and used one or two words from Bahasa Indonesia. In the occurring errors caused by language switch, researcher figured out what the media's developer attempted to convey, before translating the words into English.

The example of errors caused by language switch is:

- **koefficient** a^2, ab, b^2 **is** 1, 2, 1.

The correction is:

- **Coefficients of** a^2, ab, b^2 **are** 1, 2, 1.

6. Further Discussion on the Errors Found in the Media

From the total items of 2334, the total number of errors which needs to be corrected is 375 or 16.1%. It indicated that the media has some weaknesses in providing the learners with opportunities to use the target language to achieve communicative purposes.

Materials should achieve impact (Tomlinson, 1998). The use of English for other subjects besides English subject must give impacts into learning English itself. When materials should achieve impacts, the impacts expected must be positive ones. Since some of the errors are essential, such as incorrect or missing *to-be*, incorrect word selections, wrong word orders, sudden switch to Bahasa Indonesia, and so on, the teacher should lead students' understandings so that the errors will not give negative impacts on their behaviours in learning English.

Materials should expose the learners to language in authentic use. Materials should help them to feel at ease (Tomlinson, 1998). The English used in the media has exposed students to use mathematics terms in English. This is something new to the students and the teacher should introduce them to students in such a way so that the students feel at ease. In relation

to errors found in the media, the teacher should make sure that they know what is wrong so that they will not make the same errors.

The errors occurring in the media indicate that the developer should involve a language expert, in this case English language expert, when developing bilingual media. The students of International Standard School will get their examinations in English and they must learn the materials through the content of the media used in teaching-learning process. Therefore, errors in the media should be minimum or there should be no errors at all.

In general the media has maximised learning potential by encouraging intellectual, aesthetic and emotional involvement through the content, illustration, simulation, and interactive tasks and quizes. This is in line with Tomlnson's argument about the characteristics of good media (1998).

Further discussion on the errors occurred in the media can be explained in more details as follows:

a. **Omission Overt Errors in the Media**

The number of omission overt errors found in the media in total was 25.8% or 97 cases. Omission overt error was the biggest type of errors which was found in the media. Since overt errors mean ungrammatical sentences, it is clear that the media still lacks correct grammatical rules.

The biggest contribution to omission overt errors was of omission overt error in lexicon, with 51 cases found. It shows that some elements need to be added to 51 items in the media in order to make them grammatically correct. As discussed earlier, one of the missing elements was *to-be*. Other missing elements were *–s* and *–es* for plural forms, and preposition *of*.

Omission overt errors in morphology also occur in 38 cases. This shows that some words in the media were not spelled correctly. One of the incorrect spellings was *cuboid* for *cuboids*. The developer constantly spelled *cuboid*. Apparently the developer thought that *cuboids* were the plural form of *cuboid* so that he or she always wrote *cuboid* instead of *cuboids*.

The omission overt errors in syntax were only 8 cases. This shows that there were not many omission overt errors made at sentence level.

b. Addition Overt Errors in the Media

The number of addition overt errors found in the media in total was 18.1% or 67 cases. The biggest error occurring in the media was addition in lexicon, with 43 cases found. There were many unnecessry words added in the sentences in the media. They made the sententences ungrammatical. This

indicated that the developer overgenerated the rules of English grammar.

Addition overt errors in morphology found in the media indicated that the developer of the media still confused the part of speech such as noun, verb, and adjective. In some sentences which needed verbs, the developer added unnecessary suffixes so that they became nouns, and hence, caused errors.

The addition overt error in syntax only happened twice. In both cases, it seemed that the developer was not aware that she or he typed the same phrases twice. However, those mistypings had made the sentences ungrammatical.

c. Selection Overt Errors in the Media

The number of selection overt errors found in the media in total was 22.3% or 84 cases. The biggest selection overt error occurred was in lexicon. This indicated that the developer still confused some words in English, for example the word *then* with *than.* This was the most significant error found in the media and it ocurred in 75 cases. This indicated that the developer did not re-check her or his work, and there were no language experts evaluated the English used in the media.

The selection overt error in the media happened four times. All of the errors was a mistyping. It was clear that the

developer was not aware of the errors. Again, there were no language experts involved in developing the media.

The selection overt errors in syntax were not often found. There were 5 cases of selection overt error. The errors indicated that some rules in English grammar were still overgenerated by the developer, such as *its* and *it's*.

d. Ordering Overt Errors in the Media

The number of ordering overt errors found in the media in total was 2.1% or 11 cases. This media peformed relatively small number of ordering overt error. The six cases of ordering overt errors in morphology indicated that those errors were mistypings because in other cases, the developer had mentioned the words correctly.

There were only one case of ordering overt error in lexicon found in the media. The error had to do with the bad influence of Bahasa Indonesia. It was clear that the developer had understood the rule of ordering adjectives and noun into noun phrase. However, when he tried to order a nound and a noun into noun phrase, he seemed to confuse. In the media, he was trying to express *a toy that is in the form of a car (a toy car),* but he confused it with *a toy for car (a car toy)*. A toy car

and a car toy are different noun phrases which have different meaning.

The four cases of ordering overt errors in syntax found in the media indicated that the developer overgenerated some rules of English grammar.

e. Omission Covert Errors in the Media

The number of omission covert error found in the media in total was 15.2% or 58 cases. The errors consisted of 54 cases of omission covert error in morphology and 4 cases of omission covert error in lexicon.

The omission covert error in morphology indicated that the developer had made grammatical sentences. However, the grammar used were not proper. For example, he used past tense to express a sub-title in the menu.

The omission covert errors in exicon in the media were found when the developer failed to express certain meanings because some words were missing. However, even with the missing elements, the sententences were still grammatically correct. The researcher knew that errors ccurred since the sentences were not given in the correct contexts.

There were no omission covert errors in syntax found in the media. Some sentences in the media did not always have

subject and verb. However, in the given context, the sentences became grammaticaly correct.

f. Addition Covert Errors in the Media

The number of addition overt error found in the media was 6.3% or 24 cases. The addition covert errors occurred in 3 cases. In the media, the developer had added suffixes to some words so that they conveyed different meanings. The suffixes added to the words had made them irrelevant to the context of mathematics terms. However, even with the suffixes added, the sentences were still grammatically correct.

The addition covert errors in lexicon and in syntax happened because of the bad influence of Bahasa Indonesia. Some unnecessary words and phrases were added to some sentences in the media because the additions made good senses in expressions in Bahasa Indonesia. The sentences were grammatically correct. However, this indicated that the media still lacked naturalness.

g. Selection Covert Errors in the Media

The number of selection overt error found in the media is 6.6% or 25 cases. The selection covert errors occurred in lexicon and syntax level. In lexicon level, the developer selected wrong words in some contexts. The most significant wrong selection were in the context of questioning. The

grammar and ordering were correct, but the question words chosen were not. This indicated that the developer lacked knowledge in English. Therefore, the role of a language expert should be taken into account in developing bilingual media.

In syntax level, there were some incorrect tenses which were chosen by the developer for certain contexts. For example, past tense was used for the title of sub menu in the media. This indicated that the developer still confused the use of tenses in English.

h. Ordering Covert Errors in the Media

The number of ordering covert error found in the media is 2.8% or 10 cases. The ordering covert errors in morphology and lexicon occurred from mistypings. The developer was not aware of making the errors. Mistypings in the media were not fatal, but they could be disturbing for the user of the media. In total there were 37 cases of mistypings in morphology, lexicon, and syntax levels. These mistypings also indicated that the developer did not re-check his work or involved a language expert.

The ordering covert error in syntax in the media ocurred in 2 cases. The developer had produced grammatical sentences but they conveyed different meanings with the given contexts. For example, in a context of finding the range of a

function with fiven ranges, the question should be: *which is the range of function?* Instead of: *which is the function of the range?* In spoken language, the error might be called slip of the tounge. Again, however, this error might occurred because the developer did not re-check his words and or there were no language experts involved.

CHAPTER V

CONCLUSIONS AND SUGGESTIONS

A. Conclusions

The grammatical errors in mathematics bilingual media for grade eighth developed by the directorate of development of junior high school, directorate general of management of basic and junior education, ministry of national education has been analyzed and the conclusions can be drawn as follows.

1. Errors in the media are classified into omission overt error in morphology (38 cases or 10.1%), omission overt error in lexicon (51 cases or 13.6%), omission overt error in syntax (8 cases or 2.1%), addition overt error in morphology (22 cases or 5.9%), addition overt error in lexicon (43 cases or 11.6%), addition overt error in syntax (2 cases or 0.6%), selection overt error in morphology (4 cases or 1.0%), seletion overt error in lexicon (75 cases or 20.0%), selection overt error in syntax (5 cases or 1.3%), ordering overt error in morphology (6 cases or 1.6%), ordering overt error in lexicon (1 cases or 0.3%), ordering overt error in syntax (4 cases or 1.0%), omission covert error in morphology (54 cases or 14.2%), omssion covert error in lexicon (4 cases or 1.0%), addition covert error in morphology (3 cases or 0.8%), addition covert error in lexicon (12 cases or 3.1%), addition covert

error in syntax (9 cases or 2.4%), selection covert error in lexicon (17 cases or 4.4%), selection covert error in syntax (8 cases or 2.2%), ordering covert error in morphology (6 cases or 1.6%), ordering covert error in lexicon (2 cases or 0.6%) and ordering covert error in syntax (2 cases or 0.6%).

2. The causes of the errors found in media are interlingual transfer (48 cases or 12.8%), intralingual transfer (275 cases or 73.3%), cognitive and personality style (37 cases or 9.9%), and language switch (15 cases or 4.4%).
3. The corrections for the errors are made based on the types of errors and the causes of the errors. Omission errors need addition of missing elements, addition errors need elimination of unnecessary items, selection errors need correct selection of the incorrect elements, and ordering errors need the elements to be re-ordered and or revised. Errors caused by intralingual need to be translated into Bahasa Indonesia before correction, errors caused by interlingual need to be corrected using the correct grammar rule, errors caused by cognitive and personality syle need to be checked, and errors caused by language switch need to be translated into English.

B. Suggestions

Based on the conclusions, some suggestions can be given as follows.

1. For the Media Developer
    a. The errors found in the media should be evaluated. Evaluating the errors occurring in the media would help for the corrections of the media.
    b. The developer should also know the causes of errors so that errors would not be repeated.
    c. The alternative corrections proposed by the researcher could be used as considerations for correction.
    d. Language experts need to be involved in developing bilingual media.
2. For the Teacher
    a. The media is good for teaching. However, the teacher should be aware of errors occuring in the media.
    b. The teacher should also revise whether the English version of the media has used correct terms or not so that it will not confuse or mislead students' understanding on English grammar.
3. For Other Researchers
    a. There are a lot of other error analysis methods that can be used in analyzing errors. This research uses only one of them. It is suggested that other researchers conduct similar researchs

using different and deeper theories of analysis in order to improve the findings of this research.

b. There are aspects in the media which have not been covered in the focus of this research, such as pronunciation, punctuation, mathematics terms used, etc. It is suggested that other researchers conduct the research on this media with different focuses of research.

BIBLIOGRAPHY

Al-Jarf, R. 2000. *Grammatical Agreement Errors in L1/L2 Translations*. Retrieved from http: **Error! Hyperlink reference not valid.** on 15th of January, at 8 p.m.

Baldick, C. 2001. *The Concise Oxford Dictionary of Literary Terms*. Oxford: Oxford University Press.

Brown, H.D. 1980. *Principles of Language Learning and Teaching.* New Jersey: Prentice-Hall Inc.

_____. 1994. *Principles of Language Learning and Teaching.* Englewood Cliffs: Prentice Hall Regents.

_____. 2000. *Principles of Language Learning and Teaching*. New York: Longman.

_____. 2001. Teaching by Principles. *An Interactive Approach to Language Pedagogy.* New York: Longman.

Corder, S.P. 1973. *Introducing applied linguistics*. Middlesex: Penguin.

_____. 1974. 'Idiosyncratic Dialects and Error Analysis'. In Richards, J. 1973. *Error Analysis*: *Perspectives on Second Language Acquisition*. Essex: Longman.

_____. 1987. *Error Analysis and Interlanguage*. Oxford: Oxford University Press.

Crystal, D. 1987. *A Dictionary of Linguistics and Phonetics.* 2nd Edition. New York: Basil Blackwel Inc.

_____. 1987. *The Cambridge Encyclopedia of Language.* Cambridge: Cambridge University Press.

_____. 2000. *English As A Global Language.* Cambridge: Cambridge University Press.

Cunningsworth, A. 1987. *Evaluation and Selecting EFL Teaching Materials.* London: Heinemann Education Book.

Eggins, S. 2004. *An Introduction to Systemic Functional Linguistic, 2nd*. London: Continuum.

Ellis, R. 1995. *Understanding Second Language Acquisition*. Oxford: Oxford University Press.

_____. 1997. *SLA Research and Language Teaching*. Oxford: Oxford University Press.

_____. 1997. *Second language acquisition*. Oxford: Oxford University Press.

Finch, Geoffrey. 2000. *Linguistics Terms and Concepts.* London: Macmillan Press, Ltd.

Fromkin, Victoria, and Robert Rodman. 1983. *An Introduction to Language.* London: Holt-Saunders

Halliday, M. A. K. 1985. *An Introduction to Functional Grammar.* New Castle: Athenaeum Press, Ltd.

Hashemi.2003. *Automatic Detection of Grammar Errors in Primary School Children's A Finite Approach* retrieved from http://www.ling.gu.se/ on January 15th, at 8 p.m.

Hornby, A. S. 1995. *Oxford Advanced Learner's Dictionary of Current English*. Oxford: Oxford University Press.

Hubbard, P., Jones, H., Thornton, B. and Wheeler, R. 1996. *A Training Course for TEFL.* Oxford: Oxford University Press.

Hutchinson, T., & Waters, A. 1987. *English for Specific Purposes: A learning-centered approach*. Cambridge: Cambridge University Press.

Jain, M. 1974. *Error Analysis: Source, Cause ad Significance. In Richards, J. Error Analysis: Perspectives on Second Language Acquisition.* Essex: Longman.

John, A., & Dudley-Evans, T. 1991. *English for Specific Purposes: International in scope, specific in purpose*. TESOL Quarterly, 25, 297-314.

Krippendorf, K. 1980. *Content Analysis: An Introduction to Its Methodology*. Beverly Hills: Sage Publication.

Lightbown, P.M. & Spada, N. 2003. *How Languages Are Learned.* Oxford: Oxford University Press.

McCarthy, A. C. 2002. *An Introduction to English Morphology Words and Their Structure*. Edinburgh: Edinburgh University Press.

Mohideen. 1990. *ERROR ANALYSIS-Contributory Factors to Students' Errors, with Special Reference to Errors in Written English.* Retrieved from http://www.melta.org.my.hmtl. on January 15the 2001 at 8 p.m.

Norrish, J. 1987. *Language Learning and Their Errors.* London: Macmillan Publisher Ltd.

_____.1983. *Language Learners and Their Error.s* London: Modern English Publication

Nunan, D. 1987. *Guidelines for the Development of Curriculum Resources.* Adelaide: National Curriculum Resource Centre.

Purpua, J. E 2004. *Assessing Grammar.* Cambridge: Cambridge University Press.

Richards, J.C.1973. *Error Analysis.* London: Longman.

_____. 1974. *A Non-Contrastive Approach to Error Analysis*. Essex: Longman.

_____. *et al*. 1992. *Dictionary of Language Teaching and Applied Linguistics*. Essex: Longman

_____., J., Platt, J. and Platt, H. 1993. *Dictionary of Language Teaching & Applied Linguistics*. Essex: Longman.

Segalowitz, N. 2003. *Automaticity* in Lightbown, P.M. & Spada, N. 2003. *How Languages Are Learned*. Oxford: Oxford University Press. 39

Seidlhofer, B. 2003. *Controversies in Applied Linguistics.* Oxford: Oxford University Press.

Selinker, L. 1974. *Interlanguage*. In Richards, J. (Ed.). *Error analysis: Perspectives on Second Language Acquisition*. 31-54. Essex: Longman.

Strevens, P. 1988. *ESP after twenty years: A re-appraisal.* Cambridge: Cambridge University Press.

Taylor, B. P. (1975). *The Use of Overgeneralization and Transfer Learning Strategies by Elementary and Intermediate Students of ESL*. *Language Learning*, 25, pp. 73-107.

Tomlinson, B. 1998. *Materials Development in Language Teaching.* Cambridge: Cambridge University Press.

Yule, G. 2004. *The Study of Language*. Cambridge: Cambridge University Press.

APPENDIX

Table 1. Polynomials

No	Item	Types of Errors																								Causes of Errors								Alternative Corrections
		Overt errors												Covert errors												Inter	Intra	Cont	Communication strategies					
		omission			addition			Selection			Ordering			Omission			Addition			Selection			ordering						Av	Pr	Co	Ap	La	
		M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S									
1.	Home																																	–
2.	Interactive Multimedia Mathematics for junior high school grade 8																																	–
3.	Presented by: Directorate of Development of Junior High School Directorate General of Management of Basic and Junior Education **Department** of National Education														√						√										√			Presented by: Directorate of Development of Junior High School Directorate General of Management of Basic and Junior Education **Ministry** of National Education **and Culture**
4.	Intro																																	–
5.	**SMP NEGERI** SUKA MAJU								√																								√	**SUKA MAJU JUNIOR HIGH SCHOOL**
6.	skip intro																																	–
7.	CHAPTER 1																																	–
8.	Menu:																																	–
9.	Introduction																																	–
10.	Polynomials																																	–
11.	**Factorisation** of Algebra Terms																				√										√			**Factorization** of Algebra Terms
12.	Explanation																																	–
13.	Exercises																																	–
14.	Quiz																																	–
15.	Evaluation																																	–
16.	select menu to learn more…																																	–
17.	Polynomials																																	–
18.	Mom asks Andi to buy some																																	–

	food for them.																															
19.	Dad wants a bag of French fries and one burger																															–
20.	Ani also wants a bag of French fries and a bottle of coke, whereas Mom wants one burger																															–
21.	One burger costs= 20.000																															–
22.	A bag of French fries costs = 50.000																															–
23.	A bottle of coke costs = 100. 000																															–
24.	How much money should Andi pay for all?																															–
25.	Identifications of terms in Algebraic																															–
26.	Do you still remember coefficient, variable, constant, terms, exponent of variable and like terms in **Algebraic**?				√																				√							Do you still remember coefficient, variable, constant, terms, exponent of variable and like terms in **algebra**?
27.	Well ,check this out.																															–
28.	Term: Variable and its coefficient or constant																															–
29.	Variable: A symbol to represent numbers																															–
30.	Constant: A term in Algebra represented in numbers																															–
31.	Coefficient: A constant factor of a term in **Algebraic**				√																				√							Coefficient: A constant factor of a term in **algebra**
32.	Exponent of Variable: The exponent of **algebraic**				√																				√							Exponent of Variable: The exponent of **algebra**
33.	Like term: terms having similar variable																															–
34.	Identifications of terms in				√																				√							Identifications of terms in **algebra**

	Algebraic																																
35.	Algebra expression																																–
36.	1 term (Monomial)																																–
37.	2 terms (Binomial)																																–
38.	3 terms (Trinomial)																																–
39.	Simplifications of term in Algebraic form (expression)																																–
40.	In simplifying Algebraic form 9expression), one must classify the existing terms into like terms.																																–
41.	To get a clearer idea, let's check this out.																																–
42.	Mrs. Yudi asks her pupil, Retno, to simplify all her classmates' order of food and drinks																																–
43.	Algebraic tiles model																																–
44.	Mr. Heru asks his pupils to make Algebraic tiles model like this:																																–
45.	If x^2 and $–x^2$ are combined, they will eliminate one another or equal to zero																																–
46.	If x and –x are combined, they will eliminate one another or equal to zero																																–
47.	If 1 and -1 are combined, they will eliminate one another or equal to zero																																–
48.	Please simplify the expression of 2x-5-3x+1																																–
49.	Conclusion of A Polynomials																																–
50.	1. A Polynomials is either a monomial or a sum of																																–

	monomial. A monomial can be a number, a variable, or multiplication of a number and a variable.																														
51.	2. A P**olynomials contain** two terms is called a binomial **where as** a polynomial containing three terms is called a trinomial.	√						√								√								√						A Polynomial **containing** two terms is called a binomial, **whereas** a polynomial containing three terms is called a trinomial.
52.	To simplify a polynomial we should group like term and **than** compute them.							√																√						To simplify a polynomial we should group like term and **then** compute them.
53.	Multiplication in algebraic form (expression)																													–
54.	1. Multiplication of one term (monomial) with two terms (binomial)																													–
55.	In order to get more understanding in monomial and binomial multiplication in Algebraic form (expression), have a look at the illustration below.																													–
56.	The teacher asks Andi to calculate the area of a rectangle having length 2cm more than its width.																													–
57.	What is the area of the square?																													–
58.	Width= x																													–
59.	Length= (x+2)																													–
60.	Area= Length x Width																													–
61.	Press simulation button.																													–
62.	Multiplication of two terms (binomial) with two terms (binomial)																													–

63.	Area of a rectangle with length (a+b) and width (c+d) is?																																–
64.	Multiplication in Algebraic form (expression)																																–
65.	3. FOIL Method (First, Outer, Inner, **Laste**)															√													√			FOIL Method (First, Outer, Inner, **Last**)
66.	In order to understand the multiplication of binomial with binomial, please have a look at the illustration below.																																–
67.	The multiplication 0f (x+2) with (x+3) is:																																–
68.	Exponent in Algebraic form (expression)																																–
69.	Please remember the operation of the exponent of interger.																																–
70.	Exponent operation is understood as repeated multiplication operation with similar element.																																–
71.	repeated n times																																–
72.	Exponent in Algebraic form (expression)																																–
73.	To give exponent to Algebraic form (expression), please have a look at this illustration																																–
74.	**koefficient** a^2, ab, b^2 is 1, 2, 1		√					√																		√					√	**Cofficients** of a^2, ab, b^2 **are** 1, 2, 1
75.	koefficient a^3, a^2b, ab^2, b^3, **is** 1, 3, 3, 1		√					√																		√					√	**Cofficients** of a^3, a^2b, ab^2, b^3, are 1, 3, 3, 1
76.	Exponent in Algebraic form																																–

	(expression)																																	
77.	To make it easy in giving exponent to Algebraic form (expression) $(a+b)^n$, you can use Pascal triangle patterns																																–
78.	check this out																																–
79.	coefficient $(a+b)^0$																																–
80.	coefficient $(a+b)^1$																																–
81.	coefficient $(a+b)^2$																																–
82.	coefficient $(a+b)^3$																																–
83.	coefficient $(a+b)^4$																																–
84.	Exercises																																–
85.	1. Please identify, how many terms in each algebraic expression as follows																																–
86.	check your answer by clicking the button																																–
87.	2. Please simplify the algebraic expression below:																																–
88.	check your answer by clicking the button																																–
89.	3. What is the result of multiplication of this algebraic expression?																																–
90.	check your answer by clicking the button.																																–
91.	Are you ready for taking Quiz?																																–
92.	Type your name **than** press enter button							√																		√							Type your name **then** press enter button.
93.	1. Which is the simplest form of 2x-5-3x+1																																–
94.	2. Which is the simplest form of 5k+4j-2h-8k-6-7h ?																																–
95.	3. What kind of polynomial																																–

	term is the expression of 3c2+3f+3h=2m+2x-5, included in?																																
96.	4. What is the result of multiplication of Algebraic expression of (2x+3) (3x+5) ?																																–
97.	5. Simplify the Algebraic expression of 3(x+y) + 4(2x+3y)																																–
98.	Result																																–
99.	Total Question = 5																																–
100.	Right Answer = 5																																–
101.	Your score is 100																																–
102.	Factoring Algebraic terms																																–
103.	Factoring a number means stating it as multiplication of several numbers																																–
104.	Factors of 12																																–
105.	So, the **factor** of 12 are 1, 2, 4, 6, and 12	√																								√							So, the **factors** of 12 are 1, 2, 4, 6, and 12.
106.	Factoring Algebraic terms																																–
107.	1. Factoring using Algebra tiles																																–
108.	Udin tries to do factoring form algebraic equation of $X^2 + 3X + 2$; using algebraic tiles method.																																–
109.	Factoring Algebraic terms																																–
110.	2. Factoring out by separating the GCF (Greatest Common Factor).																																–
111.	Below is to determine the factoring of $2X^2$ -10X																																–
112.	The CGF $2x^2$-10x is:																																–
113.	**Faktor** $2x^2$- 10x = 2x (x-5)								√																	√						√	**The factor of** $2x^2$- 10x = 2x (x-5).

114.	Factoring Algebraic terms																															–
115.	Factoring can also be done by separating the GCF first.																															–
116.	The Factor 3x3-9x2+15x is		√																						√							The Factor **of** $3x^3-9x^2+15x$ is..
117.	The factor $3x^3-9x^2+15x = 3x(x^2-3x+5)$		√																						√							The factor **of** $3x^3-9x^2+15x = 3x(x^2-3x+5)$.
118.	Factoring Algebraic terms																															–
119.	3. Factoring out by guessing possible factors																															–
120.	Have a look at this illustration:																															–
121.	Rahmah is doing the factoring $x^2+7x+12$ by guessing and trying the possible factors with the help of Algebra tiles																															–
122.	Method 1																															–
123.	Method 2																															–
124.	Method 3																															–
125.	simulation																															–
126.	Incorrect																															–
127.	Left= 6																															–
128.	Left= 2																															–
129.	Left= 0																															–
130.	correct																															–
131.	Factoring ax^2+bx+c; with a not 0		√																						√							Factoring ax^2+bx+c; with a **is** not 0.
132.	ax^2+bx+c algebraic form (expression) with a is not equal to 0 and it can be factored out using distribution.																															–
134.	Pay attention to the rules in the illustration below:																															–
135.	Press simulation button																															–

136.	Factoring ax^2+bx+c, with a not 0		√																							√							Factoring ax^2+bx+c; with a **is** not 0
137.	Please factor out the algebraic form (expression) of $3x^2+14x+15$																																–
138.	Pay attention to these steps																																–
139.	1. Describe a x c to be the multiplication of its factors.																																–
140 .	2. Determine a couple of numbers having sum of b.																																–
141.	so that, $3x^2+14x+15 = 3x^2+5x+9x+15$																																–
142.	Exercises																																–
143.	1. Determine the factors of $x^2+2xy+y^2$																																–
144.	Completion: $x^2+2xy+y^2= x^2+xy+xy+y^2$																																–
145.	Your answer is incorrect!																																–
146.	Your answer is correct!																																–
147.	2. Determine the factors of $2x^2+7x+3$																																–
148.	Completion																																–
149.	Your answer is incorrect!																																–
150.	Your answer is correct!																																–
151.	3. Determine the factors of $8x^2+2x+3$																																–
152.	Completion																																–
153.	Your answer is incorrect!																																–
154.	Your answer is correct!																																–
155.	Are you ready for taking quiz?																																–
156.	Type your name **than** press enter button.							√																		√							Type your name **then** press enter button.
157.	enter																																–
158.	1. Which one of **is** the	√			√																					√				√			Which one of these multiplication

	multiplication **bellow** produced $9x^2$-$25y^2$																																**below** produced $9x^2$-$25y^2$?
159.	2. Which **is** the factors of x^2+5x+6								√																	√							Which **are** the factors of x^2+5x+6?
160.	3. Which **is** the factors of $2x^2$+11x+12								√																	√							Which **are** the factors of $2x^2$+11x+12?
161.	4. Which **is** factors of $6x^2$+19x+15.								√																	√							Which **are** the factors of $6x^2$+19x+15?
162.	5. Determine the factors of $3x^2$+14x+15.																																–
163.	The Result																																–
164.	Total Question= 5																																–
165.	Right Answer= 4																																–
166.	Your score is 80																																–
167.	Are you ready for Evaluation? Type your name, **than** press the enter button.							√																		√							Are you ready for Evaluation? Type your name, **then** press the enter button.
168.	enter																																–
169.	1. The simplest form of $5x^2y$-$3xy^2$+$6xy^2$ is…																																–
170.	2. The form of 3a-5b-a-4b can be simplified into…																																–
171.	3. The result of addition of 4x+5y-8z and x-2y-3z is…																																–
172.	4. The **substraction** of $3x^2$+4x-2 by $3x^2$-6x+8 is…				√																								√				The **subtraction** of $3x^2$+4x-2 by $3x^2$-6x+8 is…
173.	5. -2x+3y subtracted from 2x+3y is…																																–
174.	6. If -5(y-2) is subtracted from 7(y+1), it is…																																–
175.	7. The expending of -2(-q-r) = …																																–
176.	8. The result of -3p(-4q+5r) is…																																–

177.	9. The result of (3x+4) (x-2) is…																																–
178.	10. The multiplication of (3x-4y) (4x+3y) is…																																–
179.	11. The factor of x^2+2x-48 is…																																–
180.	12. One of **factor** of $2x^2$-5xy-$12y^2$ is…	√																								√							One of **factors** of $2x^2$-5xy-$12y^2$ is…
181.	13. The factor of $4x^2$-1 is…																																–
182.	14. The factor of $9a^2$-$16b^2$ is…																																–
183.	15. The simplest form of $\frac{2a-2}{a^2+3a+2}$ is…																																–
184.	16. The simplest form of $2x^2$-3x-9/ $4x^2$-9 is…																																–
185.	17. The simplest form of $2x^2$-2x-2/ $6x^2$-x-2 is…																																–
186.	18. The simplest form of p^2-p-6/ 9-p^2 is…																																–
187.	19. The simplest form of $(x-y)^2$- $(x-y)^2$ **adalah…**											√																				√	The simplest form of $(x-y)^2$- $(x-y)^2$ **is ...**
188.	20. The simplest form of 1/a+b + 1/a-b			√																						√							The simplest form of 1/a+b + 1/a-b **is ....**
189.	21. 2/x-1 – 3/x+2 is…																																–
190.	22. x-1/ x^2-4 – 1/x-2 = …																																–
191.	23. The simplest form of x^2-x-6/ 6x-3 : 2x-6/4x-2 is…																																–
192.	Polynomials Evaluation																																–
193.	Evaluation Result																																–
194.	Total Question = 23																																–
195.	Correct Answer = 1																																–
196.	Your score is= 4. 34																																–

Table 2. Function and Relation

No	Item	Types of Errors																								Causes of Errors								Alternative Corrections
		Overt errors												Covert errors												Inter	Intra	Cont	Communication strategies					
		omission			addition			Selection			Ordering			Omission			Addition			Selection			ordering											
		M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S				Av	Pr	Co	Ap	La	
197.	Interactive Multimedia of Mathematics																																	–
198.	Relation and function																																	–
199.	Kids **play** drum band													√													√							Kids **playing** drum band
200.	Arel and Hanif **played** Trio Drum																					√					√							Arel and Hanif **are playing** Trio Drum
201.	Syahni **played** belira																					√					√							Syahni **is playing** belira
202.	Fathan **played** bass drum																					√					√							Fathan **is playing bass** drum
203.	Regita **played** snare drum																					√					√							Regita **is playing** snare drum
204.	What can you conclude?																																	–
205.	What is the **relationship** between kid and drum band?																√										√							What is the **relation** between the kids and drum band?
206.	Every member of a family has his/her own favourite fruit																																	–
207.	One of them likes banana, another one likes grapes, apple, etc																																	–
208.	So, there are connections between the member of the family and their favourite fruits																																	–
209.	This is what we call Relation																																	–
210.	Favourite Sports																																	–
211.	Mr. Budi has 5 children,																																	–

	they are Riska, Dimas, Candra, Dira, and Reni																																	–
212.	The children have different kind of favourite sports																																	–
213.	Riska plays badminton and likes swimming																																	–
214.	Dimas likes football																																	–
215.	Candra likes football too																																	–
216.	Dira and Reni have the same favourite sports, which are basketball and badminton.																																	–
217.	The connection between the children and the sports is called Relation																																	–
218.	Example of Relation																																	–
219.	When Mr. Budi's children are grouped into set A, the members of set A are… set A = { Riska, Dimas, Candra, Dira, Reni }																																	–
220.	And mr. Budi's favourite sports can be grouped into set B																																	–
221.	Set B = {Badminton, Swimming, Basketball, Football}																																	–
222.	Summary																																	–
223.	From the explanations, we can conclude that…																																	–
224.	The relation between set A and set B is the rule that relates the members of set A to the members of set B.																																	–
225.	How to Express Relation																																	–
226.	There are 3 ways to express																																	–

	relation…																																
227.	1. With arrow diagram																																–
228.	2. With Cartesian Coordinate																																–
229.	3. With ordered pairs																																–
230.	Expressing Relation in Arrow Diagram																																–
231.	Nia is having 15th birthday		√																						√								Nia is having **her** 15th birthday.
232.	She takes her friends, Asep, Bowo, Cindai, and Dian to the restaurant “nikmat”																																–
233.	The available menu are: Soto, Sop, Rawon, Pecel, and Sate																																–
234.	Nia and her friends have different **kinsd** of favourite food																					√							√				Nia and her friends have different **kinds** of favorite food.
235.	Asep likes “rawon and sop”, this time he orders rawon																																–
236.	Bowo orders gulai and pecel, those are his favourite food																																–
237.	Cindai likes sate and she orders that																																–
238.	Dian orders sop, because that is the only food that she likes																																–
239.	”Soto and sop” are Nia’s favourite food, but she orders soto only																																–
240.	Restaurant “nikmat” provides: soto, sop, rawon, pecel, gulai, sate.																																–
241.	If the children are group into set A, so the members																																–

	of set A are…																															
242.	And the menu in 'nikmat" restaurant are grouped into set B.																															–
243.	The relation is "one's favourite food"																															–
244.	Another relation might be "one's ordered food"																															–
245.	Relation "one's ordered food"																															-
246.	Expressing Relation in Cartesian Coordinate																															–
247.	To express relation we can also use cartesian coordinate																															–
248.	Cartesius field has horizontal line and vertical line																															–
249.	The names of members of set A are placed on the horizontal line and the names of members of set B are on vertical line.																															–
250.	Every member of set A who has relationship to any member of set B is expressed by using a dot.																															–
251.	Pets																															–
252.	a group of 8th junior high school students are talking about their own pets																															–
253.	Ajeng raises a dog, Dina raises a cat.																															–
254.	Novi's pet is the same as																															–

	Dina's, that is a cat																																
255.	And Bagus raises a bird																																–
256.	If the junior high school students are arranged into set A, the members of set A are..																																–
257.	And the pets are arranged into set B.																																–
258.	The relation is "one's pet"																																–
259.	We need transportation to go to one place to another																																–
260.	There are many kinds of transportation means																																–
261.	Car, bus, and train are land transportation																																–
262.	Airplane and **balloon s** are air transportation and water transportation is **such as** ship																			√		√			√								Airplane**s** and **balloons** are air transportation and water transportation is, for example, ship.
263.	If the names of transportation means are arranged into set A, the members of set a are…																																–
264.	Set A = { Car, Bus, Train, Plane, Bslloons, Ships }																																–
265.	And the kinds of transportation are arranged into set B, set B consists of..																																–
266.	Set B = { Land, Air, Water }																																–
267.	The relation of "transportation means" between set A and set B in ordered pairs is…																																–
268.	Relation = {(Car, Land), (Bus, Land), (Train, Land), (Plane,																																–

	Air), (Balloons, Air), (Ship, Water)}																															
269.	From the previous section, we can conclude, that…																															–
270.	Relation between set A and set B can be expressed in a set of ordered pairs (a, b,) **where as** a is member of set A and b is member of set B.																															Relation between set A and set B can be expressed in a set of ordered pairs (a, b), **whereas** a is a member of set A and b is a member of set B.
271.	From these diagrams, which one is the relation diagram “factor of” set A = {1, 2, 4} and set B = {2, 3, 4}																															–
272.	Solution :																															–
273.	Relation “factor of’ between set A and set B is:																															-
274.	1 is the factor of 2, 3, and 4.																															–
275.	2 is the factor of 2 and 4																															–
276.	4 is the factor of 4.																															–
277.	The arrow diagram that describes the relation “factor of” between set A and set B is the diagram b.																															-
278.	Draw an arrow diagram of the relation of “three times” between set K = {9, 12, 15, 21} and set L = {3, 4, 5, 7}																															–
279.	Solution: the arrow diagram of the relation “three times” between set K and set L is…																															-
280.	Exercise																															–
281.	Draw a Cartesian diagram for this arrow diagram																															–
282.	Express the relation between these two sets of transportation in a set of																															–

	ordered pairs.																															
283.	A = {becak, car, ship, motorcycle, plane, train, boat}																															–
284.	B = {land, water, air}								√																							–
285.	Rule of relation: **transportasi** means							√																							√	Rule of relation: **transportation** means.
286.	Solution: the set of ordered pairs of relation "transportation means" between set A and set B is..																															
287.	Relation = { (becak, land), (car, land), (motorcycle, land), (train, land), (ship, water), (boat, water), (plane, air) }																															–
288.	This set of ordered pairs is the relation between Set A and Set B.																															–
289.	Make lists of set a and set B and determine the possible relation!																															–
290.	Relation: { (paper, solid), (gasoline, liquid), (oil, liquid), (oksigen, gas), (stone, solid) }																															–
291.	Members of set A = { paper, gasoline, oil, oksigen, stone }																															–
292.	Members of set B = { solid, liquid, and gas }																															–
293.	Rule of relation = kind of material																															–
294.	Look at the arrow diagram below!																															–
295.	The relation between set a and set B is…																															–

296.	a. factor of																															–
297.	b. more than																															–
298.	c. less than																															–
299.	d. half of																															–
300.	The answer is right.																															–
301.	Four people like to play different kinds of sport; Rio likes to play basketball and football, Dewi likes to play badminton and chess, Ratih likes to play basketball, and Zaki likes to play basketball and badminton.																															–
302.	According to the previous data, determine the relation…																															–
303.	a. likes to learn																															–
304.	b. likes to play																															–
305.	c. likes to eat																															–
306.	d. likes to drink																															–
307.	The set A {0, 1, 4, 9, 16} and the set B {0, 1, 2, 3, 4}. The relation between set A and set B is…	√																							√							The set A **is** {0, 1, 4, 9, 16} and the set B **is** {0, 1, 2, 3, 4}. The relation between set A and set B is…
308.	a. less than																															–
309.	b. factor of																															–
310.	c. square of																															–
311.	d. square root of																															–
312.	the answer is wrong																															–
313.	Set A = {0, 1, 2, 3, 4} and set B = {0, 1, 4, 9, 16}																															–
314.	The relation between set A and set B is…																															–
315.	a. less than																															–

316.	b. factor of																																–
317.	c. square of																																–
318.	d. square root of																																–
319.	Look at this coordinate diagram below!																																–
320.	The relation between set A and set B is…																																–
321.	a. More than																																–
322.	b. less than																																–
323.	c. opposite of																																–
324.	d. factor of																																–
325.	Number of questions = 5																																–
326.	right answer = 1																																–
327.	total score = 20																																–
328.	Function expression																																–
329.	Have you ever tasted the flavor of sugar, salt, vinegar, and other kinds of spices?																																–
330.	Try to taste the sugar																																–
331.	It must be sweet.																																–
332.	**How** is the taste of salt?								√																	√							**What** is the taste of salt?
333.	It must be salty, there is no salt, which is sweet.																																–
334.	**How** is the taste of pepper?								√																	√							**What** is the taste of pepper?
335.	Is there any pepper, which is not hot?																																–
336.	Is there any vinegar, which is not sour?																																–
337.	Introduction to function																																–
338.	The spices are arranged into set A, the members are …																																–
339.	Set A = {sugar, salt, pepper, vinegar}																																–
340.	And the taste of the spices																																–

	are arranged into set B.																															
341.	Set B = {sweet, salty, hot, sour}																															–
342.	The relation is “tastes of spices”																															–
343.	Function notation																															–
344.	**Relationship** between set A and set B is a function (mapping)																		√					√								**Relation** between set A and set B is a function (mapping).
345.	In the arrow diagram, members of set A are related to the members of the set B.																															–
346.	Drawn by an arrow																															–
347.	Summary																															–
348.	Because **of** every member of set A is related to the member of set B, and every member of set A has only one partner in set B, **so that** the relation between set A and set B is called function or mapping.				√																				√							Because every member of set A is related to the members of set B, and every member of set A has only one partner in set B, the relation between set A and set B is called function or mapping.
349.	Function of set A and set B is a relation, which relates each member of set A to exactly one member of set B																															–
350.	Domain, co-domain, and Range of function																															–
351.	If a function is like this arrow diagram below. **So** the domain, codomain, and range can be seen from the simulation below.																√								√							If a function is like this arrow diagram below, the domain, co-domain, and range can be seen from the simulation below.
352.	Summary																															–
353.	From the previous section																															–

	we can define domain, co-domain, and function range																															
354.	Set A is domain																															–
355.	set B is co-domain																															–
356.	Members of set B which are related to set A **is** Range		√						√																	√						Members of set B which are related to set A **are called** Range
357.	One on one correspondence																															–
358.	If province capitals in Kalimantan are arranged into set A, the members of **set set** A are…					√																							√			If province capitals in Kalimantan are arranged into set A, the members of **se**t A are…
359.	Set A = { Banjarmasin, Samarinda, Palangkaraya, Pontianak }																															–
360.	And provinces in Kalimantan are into set B													√												√						And provinces in Kalimantan are **arranged** into set B
361.	Set B { South Kalimantan, East Kalimantan, Central Kalimantan, West Kalimantan } On the reserve, when the relation of “the capitals” is from set A to set B, the arrow diagram is as below																															–
362.	Next we will draw both relations in one arrow diagram																															–
363.	Notation for the relation of “province capital” is f and notation for relation of “the capitals” is g, both diagrams are shown as the picture below.																															-
364.	Summary																															–
365.	from the example we can determine that …																															–

366.	Reciprocal relation or mapping, for both f and g, is called one on one correspondence																																–
367.	Counting of function																																–
368.	Calculating the Function Value																																–
369.	See this arrow diagram carefully																																–
370.	Minus one is 2 → 1 read: 2 minus 1 is 1																																–
371.	3 → 2 read: 3 minus 1 is 2																																–
372.	4 → 3 read: 4 minus 1 is 3																																–
373.	5 → 4 read: 5 minus 1 is 4																																–
374.	See this arrow diagram carefully																																–
375.	If the member of K is x and member of L is (x-1) so the relation of f is f: x → (x-1)																																–
376.	If the relation is a function, then f(x): (x-1) or y = (x-1)																																–
377.	Those equations are called the rule of function, or the formula of function, or the equation of function																																–
378.	Table of function value																																–
379.	See the function f(x) = (x-1) for x = 2, then:																																-
380.	The value of f(2) = 1 is called the function value for x=2																																–
381.	The function value of each member of set K is arranged in this function table																																–
382.	Exercises																																–

383.	Domain of the function in the arrow diagram below is ..																																		–
384.	Solution : domain is the origin area of function																																		–
385.	The domain in the arrow diagram is {1, 2, 4}																																		–
386.	See the Cartesian coordinate below carefully																																		-
387.	Which are the members of co-domain																																		–
388.	check the answer																																		–
389.	Solution : co-domain is the opposite area from the function																																		–
390.	co-domain in the Cartesian coordinate above is {1, 2, 3, 4}																																		–
391.	See this arrow diagram below carefully																																		–
392.	Which is **the function of range?**																							√						√				Which is **the range of function?**
393.	Solution : range is the result area of the function																																		–
394.	range in the arrow diagram above is {1, 4, 9}																																		–
395.	See the function table of f(x) = x^2- x below																																		–
396.	fill the blank correctly!		√																								√							Fill **in** the blank correctly!	
397.	And draw Cartesian coordinate																																		–
398.	Solution : the Cartesian coordinate of the function f(x) = x^2- x is…																																		–
399.	Quiz																																		–

400.	F(x) = 5+2x the domain is {-2, -1, 0, 1, 2} the co-domain is…																																–
401.	the answer is wrong																																–
402.	If f(x) = 3x-2 and f(a) = 7, **so** the value of a is…																√								√								If f(x) = 3x-2 and f(a) = 7, **the value of a is…**
403.	Linear function is defined by f(x) = a X b																																–
404.	In the function f(-2) = -8 and f(5) = 13, so the values of a and b are…																																–
405.	See the graph of function below!																																–
406.	based on the graph, the function of f(x) is…																																–
407.	The answer is right																																–
408.	F(x) = x quadrate of 2																																–
409.	F(x) = x quadrate root of 2																																–
410.	Number of questions = 5																																–
411.	right answer = 1																																–
412.	total score = 20																																–
413.	evaluation result																																–
414.	Are you ready for evaluation?																																–
415.	Type your name, **than** press the enter button							√																		√							Type your name, **then** press the enter button.
416.	Relation of set A = {2, 3, 5, 6} to set B = {4, 10, 12, 15} is…																																–
417.	a. Half of																																–
418.	b. more than																																–
419.	c. factor of																																–
420.	d. twice of																																–
421.	your answer is incorrect																																–
422.	A function with formula f(x)																																-

	= x^2-5x																															
423.	The right value of function is …																															–
424.	your answer is correct																															–
425.	P = {1, 2} and Q = {a, b, c} **are known.**																√							√							P = {1, 2} and Q = {a, b, c}
426.	How many **mapping** can be made from set P to set Q ..	√																							√							How many **mappings** can be made from set P to set Q?
427.	A function with formula g(x) = ax – 5																															-
428.	The value of function g for x = -1 = 3																															–
429.	the value of a is…																															–
430.	A function with formula f(x) = x^2-1 if the domain of the function is {x | -2 ≤ x ≤ 3, x ◻ R} **so**, the range of f is…															√								√							A function with formula of f(x) = x^2-1. If the domain of the function is {x | -2 ≤ x ≤ 3, x ◻ R}, the range of f is…
431.	Domain of relation R : A → B is set…																															–
432.	Co-domain of relation R : P → Q is set …																															–
433.	The rule of relation in the arrow diagram is …																															–
434.	a. More than																															–
435.	b. one more than																															–
436.	c. less than																															–
437.	d. one less than																															–
438.	answer check																															–
439.	Look at the arrow diagram below																															–
440.	which one is a function …																															–
441.	Set A = {2, 3, 4, 5} and set B = {5, 7, 8, 9}																															–
442.	Relation of set A to set B is a function, if the relation is…																															–

443.	a. Factor of																																			–
444.	b. less than																																			–
445.	c. multiply of																																			–
446.	d. three less than																																			–
447.	Total question = 10																																			–
448.	correct answer = 4																																			–
449.	your score is = 40																																			–
450.	evaluation result																																			–
451.	Click for additional question (essay)																																			–
452.	Relation of set A = {2, 3, 5, 6} to set B = {4, 10, 12, 15} is..																																			–
453.	a. A half of																																			–
454.	b. more than																																			–
455.	c. factor of																																			–
456.	d. twice of																																			–
457.	A function with formula f(x) = x^2-5x the right value of function is…																																			-
458.	P = {1, 2} and Q = {a, b, c} **are known.**																√						√													P = {1, 2} and Q = {a, b, c}
459.	how many mapping can be made from set P to set Q …																																			–
460.	A function with formula g(x) = ax-5																																			-
461.	the value of function g for x = -1 is 3																																			–
462.	the value of a is…																																			–
463.	A function with formula f(x) = x^2-1 if the domain of function f is {x |-2 ≤ x ≤ 3, x ▫ R} **so** the co-domain of f is…																√						√													A function with formula of f(x) = x^2-1. If the domain of function f is {x |-2 ≤ x ≤ 3, x ▫ R}, the co-domain of f is…

464.	Relation of set A to set B is expressed in a set of ordered pairs {(-2,4) (-1, -3) (2, 6) (7, 10) (8, 5)}																																	–
465.	write down the set A and set B																																	–
466.	draw the Cartesian coordinate of the relation																																	–
467.	is the relation also a function? Explain !																																	–
468.	A = {a, b, c} B = {-1, 0} **are known.**																√						√											A = {a, b, c} B = {-1, 0}
469.	make all the possible mapping of set A to set B																																	–
470.	Determine how many **mapping** can be made	√																							√									Determine how many **mappings** can be made.
471.	A function with formula f(x) = 2x-5 and the domain M = {-5, -1, 2, 6, 8}																																	-
472.	determine the value of function f																																	–
473.	draw the graph of function in Cartesian coordinate																																	–
474.	Express the relation of these two sets of arrow diagram																																	–
475.	M = {Liputan 6, Seputar Indonesia, Lintas 5, Good News, Editorial Malam, Fokus, Reportase Sore, Redaksi Sore, Topik Petang, Berita Nasional, Sorot, Brutal}																																	–
476.	P = {RCTI, TPI, Global TV, SCTV, Indosiar, LaTivi, METRO TV, TRANS, TRANS 7, antv, TVRI}																																	–

477.	the rule of the relation: news program from																																–
478.	E = {x |-2 < x < 5, x ▫ round number}																																E = {x |-2 < x < 5, x ▫ real number}.
479.	F = { y |0 ≤ y ≤ 10 , y ▫ round number start from 0}																																F = { y |0 ≤ y ≤ 10 , y ▫ real number start from 0}.
480.	The rule of relation : three less than																																–
481.	Set T = {0, 4, 8, 12, 16, 20, 24, 28} **is known** and relation R of set T with the rule of relation "multiplication of"																	√						√									Set T = {0, 4, 8, 12, 16, 20, 24, 28} and relation R of set T has the rule of relation "multiplication of".
482.	Express the relation R in a set of ordered pairs																																–
483.	express the relation R in an arrow diagram																																–
484.	Express the relation R in Cartesian coordinate																																–
485.	Domain of relation R : A → B is set…																																–
486.	a. A																																–
487.	b. B																																–
488.	c. A and B																																–
489.	d. part of B																																–
490.	Co-domain of relation R : P → Q is set …																																–
491.	a. P																																–
492.	b. Q																																–
493.	c. P and Q																																–
494.	d. empty																																–
495.	The rule of relation in the new arrow diagram is …																																–
496.	a. more than																																–
497.	b. less than																																–

498.	c. one less than																																–
499.	Look at the diagram below																																–
500.	which one is a function …																																–
501.	Set A= {2, 3, 4, 5} and set B = {5, 7, 8, 9}																																–
502.	Relation of set A to set B is a function, if the rule of relation is…																																–
503.	a. Factor of																																–
504.	b. less than																																–
505.	c. multiply of																																–
506.	d. three less than																																–
507.	It is known that P = {Malang, Surabaya, Semarang, Bandung, Jakarta, Denpasar, Sumenep} and Q = {Jatim,Jateng, Jabar, Bali}																																–
508.	express the relation of R : P → Q in a set of ordered pairs in rules of:																																–
509.	a. capital of																																–
510.	b. city in																																–
511.	A = {a, b, c, d, e} and B = {1, 2, 3, 4, 5, 6} **are known**																√							√								A = {a, b, c, d, e} and B = {1, 2, 3, 4, 5, 6}.
512.	The relation of A to B is shown in these sets of ordered pairs.																																–
513.	Are the sets of ordered pairs a function ?																																–
514.	Mention the reason!																																–
515.	V = {a, i, u, e, o} and K = {x, y, z} **are known.**																√							√								V = {a, i, u, e, o} and K = {x, y, z}.
516.	determine how many possible functions are there																																–

517.	from set V to set K																																–
518.	from set K to set V																																–
519.	from set V to set V																																–
520.	from set K to set K																																–
521.	The possible mappings of set P to set Q are 64.																																–
522.	How many members does the set P have if N(Q) = 8																																–
523.	how many members does the set Q have, if n(P) = 6																																–
524.	Determine how many possible **possible** functions of set A to set B, if known:				√																						√			Determine how many **possible** functions of set A to set B, **if it is known that:**	
525.	A = { x|x ≤ 6, y ▫ round number start from 10}																																–
526.	and B = {-3 < x ≤ 5, x ▫ round number}																																–
527.	colours of traffic light} and B = {colours of rainbow}																																–
528.	A= {letters that make the word “INDONESIA”} and B = {vocal letters}																																–
529.	Which one is a one by one correspondent among these sets of ordered pairs below?																																–
530.	Determine a possible set for one by one correspondent with the set:																																–
531.	{primary numbers less than 11}																																–
532.	{human’s fingers}																																–
533.	{vocal letters]																																–

534.	**{lesson in the national test}**																			√					√											**{subjects in the national examination}**
535.	{**month**, which have 31 days}	√																								√									{**months**, which have 31 days}
536.	Determine a possible set for one by one correspondent with the set:																																		–
537.	How many possible one by one correspondent of M to N ?																																		–
538.	draw																																		–
539.	Determine the value of f(-5) for each function f below:																																		–
540.	Function f : x → ax + b and a & b real numbers																																		–
541.	Write the formula of function f and determine the value of f(-25) and f(9)																																		–
542.	The formula of function g is g(x) = 3x+a																																		–
543.	if the value of g(-1) = 7, determine																																		–
544.	a. The value of a																																		–
545.	b. The formula of function g																																		–
546.	c. the value of g(5) – g(12)																																		–
547.	Write and complete this table of function $f(x) = x^3 - 2x^2+3x-6$																																		–
548.	write the set of ordered pairs of function f																																		–
549.	write the co-domain of function f.																																		–

550.	Domain of function f is {-2, -1, 1, 0, 1, 2, 3, 4}																																–
551.	draw graph of each function below by making the table first!																																–
552.	Draw the graph of function g : x → 4(x-3) and domain { x |-1 ≤ x ≤ -5 , x ◻ round number}																																–
553.	{ x |-1 ≤ x ≤ -5 , x ◻ real number}																																–
554.	Are the **graph** A and B similar?	√				√																				√							Are **graphs** A and B similar?
555.	what is your conclusion of domain in the set of real number and domain in the set of round number?																																–
556.	30 function f is defined by f(x) = 2x-3 on the domain = { x |-2 ≤ x ≤ 4 , x ◻ B} and function g is defined by g(x) = -3x+4 on the domain = { x |-1 ≤ x ≤ -5 , x ◻ B}																																–
557.	Determine the range of function f and function g																																–
558.	Write the set of ordered pairs of function f and function g																																–
559.	**Raw** the function f and function g in a Cartesian diagram							√																					√				**Draw** the function f and function g in a Cartesian diagram.
560.	Connects the points in the graph of function f and function g, so that it makes two intersecting lines																																–
561.	Determine the coordinate of	√																								√							Determine the coordinate of its

	its **intercept**																													**interception.**

Table 3. Straight Line Equation

No	Item	Types of Errors																								Causes of Errors								Alternative Corrections
		Overt errors												Covert errors												Inter	Intra	Cont	Communication strategies					
		omission			addition			Selection			Ordering			Omission			Addition			Selection			ordering							Av	Pr	Co	Ap	La	
		M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S										
562.	Constant speed of a vehicle																																	-
563.	**Makes** a straight line equation																				√						√								**Making** a straight line equation
564.	An equation of a straight line																																	-
565.	Example : an illustration of a sprout's growth																																	-
566.	The length of growing time																																	-
567.	The height of sprout																																	-
568.	An equation of a straight line																																	-
569.	to find the intersection point between the line and axis																																	-
570.	At x = 0, value of function y = 1,5x + 0,5 is y = 0,5																																	-
571.	Its intersection (0, 0,5)		√																								√								Its intersection **is** (0, 0,5).
572.	At y = 0, value of function y = 1,5x + 0,5 is 0 = 1,5 . x + 0,5																																	-
573.	Its intersection (-$^{1}/_{3}$, 0)				√																						√								Its intersection **is** (-$^{1}/_{3}$, 0)
574.	A line will **intersection** x-axis if y = 0				√																						√								line will **intersect** x- axis if y = 0.
575.	And a line will **intersection** y axis if x = 0				√																						√								And a line will **intersect** y axis if x = 0.
576.	An Equation of a Straight																																	-

	Line																														
577.	Conclusion																														-
578.	1. A curve formed by equation y = ax+b is a straight line.																														-
579.	2. The general form of a straight line equation is y = mx + c																														-
580.	3. A line will intersect x-axis if y = 0																														-
581.	4. A line will intersect x-axis if y = 0																														-
582.	5. Other equations **whose formulas use a principle of a straight line equation are:**																			√				√							Other equations **which use a principle of a straight line equation formulas are:**
583.	a. An equation of speed																														-
584.	b. An equation of voltage																														-
585.	c. An equation of mass																														-
586.	Exercise																														-
587.	1. Haris has **a car toy.** It can be operated using batteries. Suppose the toy is four cm away from the edge of the room. It is running from the floor with a constant speed of 10 cm per second										√												√							Haris has **a toy car.** It can be operated using batteries. Suppose the toy is four cm away from the edge of the room. It is running from the floor with a constant speed of 10 cm per second.
588.	a. Formulate the distance of the toy car from the edge of the room after t second if the distance of the toy car from the edge of the room is s.																														-

589.	b. Make a table relation between time and distance (t = 0 to 5 second).																																-
590.	c. Draw a graph of the line equation above.																																-
591.	d. **Dtermine** the coordinate of the point of intersection on S axis												√																	√			**Determine** the coordinate of the point of intersection on S axis
592.	e. How far will the toy car be from the edge after 6 seconds.																																-
593.	f. **How much time** will it take the toy car to reach the distance of 114 cm from the edge of the room.		√						√																	√							**How long** will it take **for** the toy car to reach the distance of 114 cm from the edge of the room?
594.	Solution =answer a=																																-
595.	**Given :** initial s = 4 cm					√																				√							initial s = 4 cm.
596.	Constant speed = 10 cm per second																																-
597.	Answer: s = 4 + 10 . t																																-
598.	=answer e=																																-
599.	The distance?			√																							√						**What is the** distance?
600.	**Subtitute** t = 6 into the equation s = 4 + 10 . t	√																												√			**Substitute** t = 6 into the equation s = 4 + 10. t
601.	We can find s = 64 the distance of the toy car from the edge after 6 second is 64 cm.																																-
602.	=answer f=																																-
603.	Second?			√																						√							**How many seconds needed by the car to reach the distance?**
604.	time needed by the toy car																																-

	to reach the distance of 114 cm from the edge of the room																																-
605.	Substitute s = 114 cm into the equations s = 4 + 10 . t																																-
606.	we will find t = 11 seconds																																-
607.	1. Equation c = 15 f + 150 shows the relationship between the amount of fat grams, and the number of calories c, in the food.																																-
608.	a. Determine the intersection of c-axis and f-axis..																																-
609.	b. Draw the line equation																																-
610.	c. A kind of food contains 20 grams fat. How many calories does the food contain?																																-
611.	d. If a food contains 750 calories, how much fat does the food contain?																																-
612.	Solution																																-
613.	=answer a=																																-
614.	The line will intersect c-axis if f = 0. We will find c = 150 the																																-
615.	Coordinate of the point if intersection on c-axis is (0, 150).																																-
616.	The line will intersect f-axis																																-

	if c = 0. We will find f = -10																															
617.	The coordinate of the point of intersection on f-axis is (-10, 0).																															-
618.	=answer b=																															-
619.	Coordinate point (-10, 0)																															-
620.	Coordinate point (-10, 0)																															-
621.	=answer c=																															-
622.	**Calory?**			√																					√							**What is the number of calories contained in the food?**
623.	**Subtitute** f = 20 into the equation the number of calories in the food is 450.											√													√							**Substitute** f = 20 into the equation the number of calories in the food is 450.
624.	=answer d=																															-
625.	Fat?																															-
626.	**Subtitute** f = 20 into the equation the amount of **fatin** the food is 40 grams											√													√							**Substitute** f = 20 into the equation the amount of **fat in** the food is 40 grams.
627.	1. Determine the x-intersections and y-intersections of each of the following lines																															-
628.	a. 8x + 10y = 80 b. y = 10x + 30																															-
629.	Solution																															-
630.	=answer a=																															-
631.	The line will intersect x-axis if y = 0 we will find: x = 10																															-
632.	The coordinate of the point of intersection on x-axis is (10, 0)																															-
633.	The line will intersect y-axis if x = 0 we will find: y = 8																															-
634.	The coordinate of the point of intersection on y-axis is																															-

	(0, 8)																																	
635.	=answer b=																																	-
636.	The line will **find** intersect x-axis if y = 0 we will find: x = -3					√																				√								The line will intersect x-axis if y = 0 we will find: x = -3.
637.	The coordinate of the point of intersection on x –axis is (-3, 0)																																	-
638.	The line will intersect y-axis if x = 0																																	-
639.	The coordinate of the point of intersection on y-axis is (0, 30)																																	-
640.	1. Draw a line of equation 2x + 6y = 60																																	-
641.	=answer=																																	-
642.	The line will intersect x-axis if y = 0 then x = 30																																	-
643.	The coordinate of intersection is (30, 0)																																	-
644.	The line will intersect y-axis if x = 0 then y = 10																																	-
645.	The coordinate of the intersection is (0, 10)																																	-
646.	1. Fahrenheit temperature = a (Celsius temperature) + b, or F = a C + b whereas a and b are Constanta. At 1 atm pressure, water boiling point is on 212□ or 100□ and water freezing point is on 32□ or 0□.																																	-
647.	Determine the value of a and b?																																	-

648.	Solution																																-
649.	**Subtitute** the value (2) to (1) to find the value of a.												√													√							**Substitute** the value (2) to (1) to find the value of a.
650.	So the value of $a = \frac{9}{5}$ **and**																																So the value of $a = \frac{9}{5}$
651.	Gradient																																-
652.	Height																																-
653.	height of stairs (1) = height of stairs (2)																																-
654.	**Lenght** of stairs base (1) ≠ **lenght** of stairs base (2)																					√				√							**Length** of stairs base (1) ≠ **length** of stairs base (2).
655.	**Lenght** of base (3) = **lenght** of base (4)																					√				√							**Length** of base (3) = **length** of base (4)
656.	**Lenght** of stairs (3) ≠ **lenght** of stairs (4)																					√				√							**Length** of stairs (3) ≠ **lenght** of stairs (4).
657.	Conclusion																																-
658.	the slope of an object is determined by the difference between the height and the base.																																-
659.	The slopes of BC, 6C, and FC are the same																																-
660.	$slope = \frac{\text{height difference}}{\text{base difference}}$																																-
661.	The term to explain the degree of **sleepness** or slope in mathematics is gradient																			√									√				The term to explain the degree of **steepness** or slope in mathematics is gradient.
662.	component y will be (+) if it ascends/ (-) if it descends																																-
663.	component x will be (+) if it moves from the left to the right (-) if it moves from the right to the left																																-
664.	Direction of Slope																																-
665.	Direction of Gradient																																-
666.	Line AB ascends from the																																-

	left to the right. The gradient will be positive.																																
667.	Line CD descends from the right to the left. The gradient will be positive.																																-
668.	Line EF descends the right. The gradient will be negative		√																							√							Line EF descends **to** the right. The gradient will be negative
669.	Line GH ascends to the left. The gradient will be negative.																																-
670.	Line IJ = 0																																-
671.	Line KL **or** has no value Line KL is parallel to y-axis.					√																				√							Line KL has no value Line KL is parallel to y-axis.
672.	Look at the two linear equation below																																-
673.	Find the value of these linear equations for the values x = 0, 1, 2, 3, 4 by making an arrow diagram for each linear equation.																																-
674.	Conclusion																																-
675.	1. Gradient of the line= $\frac{\text{the lenght of the component y}}{\text{the lenght of the component x}}$																																-
676.	2. A line with a steepness to the right upwards or to the left downward has a positive gradient																																-
677.	3. A line with a steepness to the left upwards or to the right downward has a negative gradient																																-
678.	4. The gradient of a line that has no steepness is																																-

	0 or not defined																																
679.	So, the gradient of the **lineis** the degree of steepness of straight line, and it is commonly represented by m.									√																			√			So, the gradient of the **line is** the degree of steepness of straight line, and it is commonly represented by m.
680.	Example =ma= gradient of line a.																																-
681.	mb is gradient of line b.																																-
682.	line with equation t = mx + c has gradient m./ line with equation ax + by = c has gradient $-\frac{a}{b}$.																																-
683.	Gradient → exercise																																-
6846 85..	1. Determine the gradient of line y = -2x + 2 ?																																-
686.	Solution																																-
687.	Line y = -2x + 2 has general equation y = mx + c Y = mx + c has gradient m, so y = -2x + 2 has gradient -2																																-
688.	1. Determine the gradient of line 3x – y – 10 = 0 ?																																-
689.	Solution																																-
690.	3x – y = 10 has general equation ax + by = c A line with equation ax + by = c has gradient –a/b so, the gradient is 3																																-
691.	1. Determine the gradient of the line passing through points A (3,1) and B (6,2) ?																																-
692.	Solution																																-
693.	So, the gradient of the line																																-

	along point A (3,1) and B (6,2) is 1/3																																	
693.	1. A student says that gradient of line passing through points (1,7) and (3,9) is $\frac{1-9}{7-3}$																																	-
694.	is it true or false?																																	-
695.	Explain																																	-
696.	Solution																																	-
697.	the gradient line along two points is …																																	-
698.	so the student's statement is false.																																	-
699.	1. Is it true that the following pairs of points are on one line?																																	-
700.	Explain.																																	-
701.	Solution																																	-
702.	to determine whether the three pairs of points are on the same line or not, we use the gradient																																	-
703.	a. choose two different pairs example points E (3,5) and F (-1, 3)		√																						√									Choose two different pairs, **for** example points E (3,5) and F (-1, 3).
704.	gradient EF = gradient FG																																	
705.	so, the three points are on the straight line														√																√			so, the three points are on the **same** straight line.
706.	b. choose two different pairs example points K (4,1) and M (-1, 5)		√																						√									choose two different pairs, **for** example points K (4,1) and M (-1, 5).
707.	gradient KM ≠ gradient LM																																	-
708.	so, the three points are on the straight line														√																√			so, the three points are in the **same** straight line.
709.	Determining the gradient																																	-

710.	understanding gradient explanation																															-
711.	determining **thr** gradient by counting units.																				√								√			Determining **the** gradient by counting units.
712.	another way to determine the gradient of a straight line is by counting units																															-
713.	Gradient = $\frac{height\ difference}{base\ difference}$																															-
714.	Determining the gradients of two parallel lines																															-
715.	Gradient of line L is																															-
716.	**radient** of line K is																				√								√			**Gradient** of line K is
717.	So, two lines are parallel if their gradients are the same.																															-
718.	If two lines are parallel, then $m_1 = m_2$																															-
719.	determining the gradients of two perpendicular lines.																															-
720.	Line a is perpendicular gradient is -1	√																							√							Line a is perpendicular. **The** gradient is -1.
721.	If two lines are perpendicular, then m_1 x m_2+ = -1																															-
722.	Exercise																															-
723.	1. Determine the gradient of the following line																															-
724.	solution																															-
725.	choose two points on the line example point (-2, 0) and (0, -1)		√																						√							Choose two points on the line, **for** example point (-2, 0) and (0, -1)
726.	horizontal difference (x) = +2																															-
727.	vertical difference (y) = -1																															-

| | | |

745.	type your name then press enter																																			-
746.	The gradient of the line passing through points (0, 0) and (4, 8) is…																																			-
747.	wrong answer																																			-
748.	The gradient of the line passing through points F (1, 2) and G (5, 4) is…																																			-
749.	The gradient of the line parallel to line 8x = 2y – 3 is …																																			-
750.	The gradient of the line perpendicular to line 2y – 3x – 2 = 0 is..																																			-
751.	right answer																																			-
752.	Two lines are perpendicular if..																																			-
753.	The gradient of the following line is..																																			-
754.	Two lines are parallel if..																																			-
755.	The product of the gradients of the two lines is -1																																			-
756.	the product of the gradients of the two lines is 1																																			-
757.	the gradient of the two lines are the same																																			-
758.	the gradients of the two lines are different.																																			-
759.	The gradient of the following line is…																																			-
760.	The gradient of the line passing through points O (0, 0) and P (3, -6) is…																																			-
761.	The gradient of the line																																			-

	passing through points F (1, 2) and G (5, 3) is…																																
762.	Evaluation Result																																-
763.	Number of questions = 10																																-
64.	right answer = 3																																-
765.	Your total point = 30																																-
766.	Determining SLE																																-
767.	Determining the line equation if gradient m and point (x_1, y_1) on the line are known.																																-
768.	Method 1																																-
769.	choose any **point** (x, y)	√																								√							Choose any **points** (x, y).
770.	determine the difference of the ordinate and abscissa of point (x, y) and point (x_1, y_1)																																-
771.	So, we find : ordinate difference = $y - y_1$																																-
772.	abscissa difference : $x - x_1$																																-
773.	Then, gradient m multiplied by $x - x_1$	√																								√							Then, gradient m **is** multiplied by $x - x_1$.
774.	A straight line equation passing through point (x_1, y_1) with gradient m can be stated by the formula : $y - y_1 = m(x - x_1)$																																-
775.	Method 2																																-
776.	using y = mx +c determine a straight line equation passing through B (4, 10) with gradient 2.																																-
777.	Solution																																-
778.	substitute m = 2 and point B (4, 10) to equation y = mx + c to get the value of c																																-

779.	substitute value m and c to y = m. x + c																																-
780.	we find y = 2x + 2																																-
781	Determining an equation of a straight line if coordinates of two points are known																																-
782.	Determining a straight line equation passing through point K (x_1, y_1) and L (x_2, y_2)																																-
783.	m KL = $\frac{ordinate\ difference}{abscissa\ difference}$																																-
784.	substitute m KL to m in equation :																																-
785.	A straight line equation passing through point (x_1, y_1) and (x_2, y_2) is determined by the formula																																-
786.	determining an equation of a straight line l, and passes point (x_1, y_1)																																-
787.	**Example: straight line k parallel to a straight line l is y = 2x + 3.**			√																					√							Example: **the equation of straight line k which is parallel to a straight line l is y = 2x + 3.**
788.	Straight line k passes through B (2, 6)																																-
789.	Determine the equation of straight line k																																-
790.	Solution																																-
791.	The equation of the straight line l y = 2x + 3 l and k are parallel, so $m_1 = m_2$																																-
782.	B (2, 6) and m k = 2substituted to the equation	√																							√							B (2, 6) and m k = 2 **are** substituted to the equation.
793.	A straight line equation passing through B (2, 6) and parallel to straight line y =																																-

	2x + 3 is y = 2x + 2																															
794.	determining an equation of a straight line which is perpendicular to straight line l, and passes trough point (x_1, y_1)																															-
795.	Determine an equation of straight line l passing through point A (-5, 2) and perpendicular to straight line l	√																								√						Determine an equation of straight line l passing through point A (-5, 2) and **is** perpendicular to straight line l.
796.	a. Determine an equation of straight line l																															-
797.	b. Straight line l passes through point (3, 0) and (0, -5)																															-
798.	Determine an equation of straight line l based on the result of the equation **is** step (a)							√																				√				Determine an equation of straight line l based on the result of the equation **in** step (a).
799.	Determine the gradient which is perpendicular to straight line l																															-
800.	The equation of straight line passing through point A (-5, 2) and perpendicular to straight line l at the figure is $y = -\frac{3}{5}x - 1$		√																							√						The equation of straight line passing through point A (-5, 2) and **is** perpendicular to straight line l at the figure is $y = -\frac{3}{5}x - 1$.
801.	Summary																															-
802.	the steps to determine an equation of straight line which is perpendicular to straight line l, and passes through point (x_1, y_1) are:																															-
803.	1. Determine m_1 of the																															-

	straight line l																															
804.	2. Determine m_2 of the straight line which is perpendicular to the straight line l, with $m_1 \times m_2 = -1$ **atau** $m_2 = -\frac{1}{m1}$							√																						√	**2.** Determine m_2 of the straight line which is perpendicular to the straight line l, with $m_1 \times m_2 = -1$ **or** $m_2 = -\frac{1}{m1}$
805.	3. Substitute m_2 and point (x_1, y_1) to equation $y - y_1 = m(x - x_1)$																														-	
806.	4. Solve the equation																														-	
807.	Determining a coordinate of a point of two straight lines																														-	
808.	Example: two straight lines l and k with equations $x - y = -3$ and $-x - y = 5$																														-	
809.	a. draw two straight lines on the Cartesian coordinates																														-	
810.	b. do both straight lines intersect?																														-	
811.	from graph (a) determine the coordinate of the intersection																														-	
812.	Solution																														-	
813.	To determine the point of two straight lines l and k, first draw tables of a pair of the straight line																														-	
814.	Drawing a line if a gradient and a point passed through is determined.																														-	
815.	Example: draw a straight line passing through a point (2, 4) and its gradient -3/2		√																							√					Example: draw a straight line passing through a point (2, 4) and its gradient **is** -3/2.
816.	Step 1																														-	
817.	draw a point (2, 4) at																														-	

	Cartesian coordinate																																			
818.	determine the vertical difference (y) and the horizontal difference (x) of the given gradient																																			-
819.	down = 3 units, to the right = 2 units																																			-
820.	Find another point of a point (2, 4) down 3 units then to the right 2 units a point (4,1) is found.																																			-
821.	connect the two points to make a straight line																																			-
822.	Exercise																																			-
823.	1. Determine an equation of a straight line with gradient 3 and intersecting point (2, -6)																																			-
824.	Solution																																			-
825.	Method 1																																			-
826.	use the formula $y - y_1 = m (x - x_1)$																																			-
827.	So we will find y = 3x – 6 – 6 Y = 3x – 12																																			-
828.	So we will find y = 3x – 6 – 6 Y = 3x – 12																																			-
829.	substitute m = 3 and point (2, -6) to equation y = mx + c to find c																																			-
830.	c = -12 / subtitute c = -12 to equation y = mx + c, so we will find y = 3x -12 .																																			-
831.	So, an equation of a straight line with gradient 3 intersecting point (2, -6) is y = 3x – 12																																			-

832.	So we will find y = 3x – 6 – 6 Y = 3x – 12																																		-
833.	Method 2																																		-
834.	substitute m = 3 and point (2, -6) to equation y = mx + c to find c																																		-
835.	c = -12 substitute c = -12 to equation y = mx + c , so we will find y = 3x – 12																																		-
836.	so, an equation of a straight line with gradient 3, and intersecting point (2, -6) is y = 3x – 12																																		-
837.	2. Determine an equation of a straight line passing through points B and C as shown in the following figure																																		-
838.	Solution																																		-
839.	Coordinate point B is (-2, 3)																																		-
840.	coordinate point C is (4, -1)																																		-
841.	**subtitute** the values of (x_1, y_1) and (x_2, y_2) into the equation												√																		√				**substitute** the values of (x_1, y_1) and (x_2, y_2) into the equation.
842.	so an equation of a straight line passing through points B and C is $y = -\frac{2}{3}x + \frac{5}{3}$																																		-
843.	3. Determine an equation of a straight line passing through A (5, 2) and parallel to straight line l		√					√																	√									Determine the equation of a straight line passing through A (5, 2) and **is** parallel to straight line l.
844.	solution																																		-
845.	$M_1 = \frac{ordinate\ difference}{abscissa\ difference}$																																		-
846.	the two lines are parallel then, $m_1 = m_2$																																		-

847.	substitute $m_2 = \frac{5}{3}$ and A (5, 2)into the equation																															-
848.	so, **an** equation of a straight line passing through A (5, 2) and parallel to straight line l is 3y = 5x – 19		√						√																	√						So, **the** equation of a straight line passing through A (5, 2) and **is** parallel to straight line l is 3y = 5x – 19.
849.	4. Straight line g with gradient 2 passes through point B (2, 13)																															-
850.	a. determine the equation of the straight line g and the equation of straight line h																															-
851.	draw both straight lines on Cartesian coordinate																															-
852.	do the two straight **line** intersect?	√																								√						Do the two straight **lines** intersect?
853.	determine the coordinate of intersection																															-
854.	solution																															-
855.	m = 2 and A (-1, 1) are substituted into $y - y_1 = m (x - x_1)$																															-
856.	y = 2x + 3																															-
857.	m = 3 and B (2, 13) are substituted into $y - y_1 = m (x - x_1)$																															-
858.	y = 3x + 7																															-
859.	To draw the two straight lines on the Cartesian coordinate, first draw a table of coordinate point pairs																															-
860.	table of equation y = 2x + 3																															-
861.	table of equation y = 3x + 7																															-
862.	yes, both lines intersect																															-

863.	the coordinate of intersection point of y = 3x + 7 and y = 2x + 3 is (-4, -5)																															-
864.	5. Determine the equation of line k passes through point (6, -3) and perpendicular to line -4x + y + 1 = 0		√																						√							Determine the equation of line k passes through point (6, -3) and **is** perpendicular to line -4x + y + 1 = 0.
865.	left and right part are multiplied by 4																															-
866.	Solution																															-
867.	**an** equation -4x + y +1 = 0 has general equation ax + by + c = 0 with gradient m= -b/a		√			√																				√							Equation -4x + y +1 = 0 has general equation **form** ax + by + c = 0 with gradient m= -b/a.
868.	Two lines that perpendicular has gradient m_1 x m_2 = -1		√																							√							Two lines that **are** perpendicular has gradient m_1 x m_2 = -1.
869.	substitute $m_2 = -\frac{1}{4}$ and point (6, -3) to equation y – y_1= m (x – x_1)																															-
870.	So, the equation of line k passes through point (6, -3) and perpendicular to line -4x + y +1 = 0 is 4y = -x – 6		√																							√							So, the equation of line k which passes through point (6, -3) and **is** perpendicular to line -4x + y +1 = 0 is 4y = -x – 6.
871.	Are you ready for a quiz?																															-
872.	Type your name then press enter																															-
873.	**An** equation of the line passing through A (2, 3) with gradient -4 is…								√																	√							**The** equation of the line passing through A (2, 3) with gradient -4 is…
874.	**An** equation of the line passing through B (4, -6) with gradient $-\frac{3}{2}$ is…								√																	√							**The** equation of the line passing through B (4, -6) with gradient $-\frac{3}{2}$ is…
875.	wrong answer																															-
876.	right answer																															-

877.	**An** equation of the line passing through points (0, 2) and (-1, -3) is…							√																√							**The** equation of the line passing through points (0, 2) and (-1, -3) is…
878.	**An** equation of the line passing through points (-4, 8) and (6, -2)							√																√							**The** equation of the line passing through points (-4, 8) and (6, -2).
879.	**An** equation of the line passing through points (4, 3) and parallel to line y = 2x + 3 is…		√					√																√							**The** equation of the line passing through points (4, 3) and **is** parallel to line y = 2x + 3 is…
880.	**An** equation of the line parallel to line 6x – 2y + 1 = 0 and passes through (-1, 2) is…							√																√							**The** equation of the line parallel to line 6x – 2y + 1 = 0 and passes through (-1, 2) is…
881.	**An** equation of a perpendicular line 2x + 3y – 5 = 0 and passes through D (-9, -6) is…							√																√							**The** equation of a perpendicular line 2x + 3y – 5 = 0 and passes through D (-9, -6) is…
882.	**An** equation of the line passing through point (6, -3) and perpendicular to line y = 4x – 1 is…		√					√																√							**The** equation of the line passing through point (6, -3) and **is** perpendicular to line y = 4x – 1 is…
883.	Coordinates of the point of intersection of lines 3x – y + 14 = 0 and 2x + y = -1 is…																														-
884.	A point of intersection of lines k and m with equations y = 3x + 5 and 2y = 7x + 12 is…																														-
885.	Evaluation Result																														-
886.	Number of questions = 10																														-
887.	right answer = 2																														-
888.	your score is = 20																														-
889.	Are you ready for Evaluation?																														-
890.	type your name **than** press							√																√							Type your name **then** press the

	the enter button																																enter button.
891.	An equation of line 2x – 4y = 12 will intersect y-axis at point…																																-
892.	Draw an equation of line 3y = 2x – 6																																-
893.	your answer is correct																																-
894.	The following graph has equation …																																-
895.	The gradient of line -3x + 9 = 5y + 3 is…																																-
896.	The gradient of line 2x – y + 3 = 0 is…																																-
897.	The gradient of line 8y = -2x + 21 is…																																-
898.	The gradient of the line passing through points (2, -5) and (4, 6) is…																																-
899.	If D (-4, 7) and E (5, -2), then the gradient of line DE is…																																-
900.	If the gradient of the line passing through points B (4, n) and C (-4, 2n) is -1, then n = …																																-
901.	In line y = mx + n passing through point (4, 6) and (-2, 3), the value of m + n is…																																-
902.	The gradient of the line passing through points (0, 0) and (2, 8) is…																																-
903.	The equation straight line which through point (2, 4) with gradient 4		√																							√							The equation **of** straight line, which passes through point (2, 4) with gradient 4, is…
904.	**An** equation of the line passing through points K (-1, 4) and L (2, 3) is…							√																		√							**The** equation of the line passing through points K (-1, 4) and L (2, 3) is…

905.	A line which has a negative gradient is…																															-
906.	**An** equation of the line **paasing** through point (4, -2) and gradient 3 is…							√																	√							**The** equation of the line **passing** through point (4, -2) and gradient of 3 is…
907.	A line parallel to 3x = -y – 8 and passes through point (-1, 6) is…																															-
908.	A gradient of line which perpendicular to line 2y = -x – 2 is…		√																						√							Put **to be** into the sentence, so that: A gradient of line which is perpendicular to line 2y = -x – 2 is…
909.	A line L intersects y – axis at point (0, -4) and intersects x-axis at point (2, 0)																															-
910.	which one is parallel to L…																															-
911.	**An** equation of a line passing through point I (2, -4) and parallel to y-axis is…		√					√																	√							**The** equation of a line passing through point I (2, -4) and **is** parallel to y-axis is…
912.	**An** equation of a line passing through point (3, -9) and perpendicular to a line passing through point (8, 5) and (-1, 14) is…		√					√																	√							**The** equation of a line passing through point (3, -9) and **is** perpendicular to a line passing through point (8, 5) and (-1, 14) is…
913.	Line P perpendicular to a line passing through points K (-5, 7) and L (4, -5) the gradient **og** line P is…		√					√																	√							Line P **is** perpendicular to a line passing through points K (-5, 7) and L (4, -5) the gradient **of** line P is…
914.	An equation of lines K and L is respectively y = 5x – 6 and 5y + x + 10 = 0 .																															-
915.	the relationship of line K and L is…																															-
916.	Intersection on (-6, 10)																															-
917.	**adjecent**																			√									√			**adjacent**
918.	perpendicular																															-

919.	parallel																															-
920.	**An** equation of a line passing through points (-4, 4) and perpendicular to line 3y = -2x + 12 is…		√					√																	√						**The** equation of a line passing through points (-4, 4) and **is** perpendicular to line 3y = -2x + 12 is…
921.	Coordinates of the point of intersection of the lines y + x – 5 = 0 and x – y – 3 = 0 is…																															-
922.	evaluation result																															-
923.	Total question = 25																															-
924.	correct answer = 4																															-
925.	your score is 16																															-

Table 4. System of Linear Equation with two Vaiables

No	Item	Types of Errors																								Causes of Errors								Alternative Corrections
		Overt errors												Covert errors															Communication strategies							
		omission			addition			Selection			Ordering			Omission			Addition			Selection			ordering												
		M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	Inter	Intra	Cont	Av	Pr	Co	Ap	La	
926.	The application of SLETV in daily life																																	–
927.	Dinda bought 5 books and 3 pens in a shop, the price was Rp 65.000																																	–
928.	Yuda bought 4 books and 2 pens in the same shop with a Rp. 100.000 paper money																																	–
929.	Reviewing linear equations with one variable																																	–
930.	In the previous chapter, you have learned linear equations with one variable.																																	–
931.	Do you still remember about that lesson?																																	–
932.	If the price of two apples is Rp. 10. 000 can you find the price of 1 apple?																																	–
933.	The price of an apple is x																																	–
934.	We can get such an equation as follows: 2x = Rp 10.000																																	–
935.	The value of x of the above equations is therefore x = 5000																																	–
936.	Remember! When the value of x is known, x is a variable.																																	–
937.	the open sentence 2x = 10.																																	–

	000 uses the sign "="																																
938.	An open sentence that uses the sign "=" is called an equation.																																–
939.	If the highest power of a variable in an equation is one, then the equation is called a linear equation.																																–
940.	A linear equation that only has only one variable is called a linear equation with variable.																																–
941.	Thus, the equation of 2x = 10.000 is an example of a linear equation with one variable.																																–
942.	Remember the following three principles for solving problems of linear equation with one variable:																																–
943.	To add a certain number to both sides																																–
944.	To subtract a certain number from both sides																																–
945.	To divide or multiply both sides by any certain number, and not zero.																																–
946.	The common formula of a linear equation with one variable is : ax + by = 0 with a ≠ 0 and b is a real number.																																–
947.	x is called a variable																																–
948.	a is called a coefficient																																–
949.	b is called a constant																																–
950.	The **substitute** of a variable in a such way that the												√													√							The **substitution** of a variable in a such way that the equation

	equation become true is called a solution of the equation																															becomes true is called a solution of the equation.
951.	**Given** the equation ax + by = 0 , if x is changed into –b/a **so** the value of x = -b/a fulfills the following equations ax + by = 0				√																				√							The equation ax + by = 0, if x is changed into -b/a so the value of x = -b/a fulfills the following equations ax + by = 0.
952.	o, x = -b/a is the solution of the equation ax + by = 0																															–
953.	The sets of all equation is called the solution set							√																	√							The sets of all equations **are** called the solution sets.
954.	in the equation ax + by = 0 the solution set is {-b/a}																															–
955.	To understand the concept of linear equations with two variables better, find the answers of the following questions: is there the sign “=” ?																															–
956.	what is the number of variable?																															–
957.	what is the value of the highest power of the variable?																															–
958.	in the following equations **and determine which equations one linear equations with two variables**																							√		√						**In the following equations, determine which one is linear equation with two variables.**
959.	X + 9 = 5 LETV																															
960.	4a – 2 = 9 not LETV because the equation only has one variable		√																						√							4a – 2 = 9 **is** not LETV because the equation only has one variable.
961.	Find the solution set of the following equations;																															–

962.	Solution part a																																	–
963.	thus, the solution set is {4}																																	–
964.	Part b																																	–
965.	thus, the solution set is {-4}																																	–
966.	Write down the following statements in the form of the linear equation of two variables																																	–
967.	a. The difference of length and width of a rectangular is 5																																	–
968.	b. Three times first number plus **two times** second number is 24		√						√																		√							Three times **of** first number plus **twice of** second number is 24.
969.	Solution part a																																	–
970.	If the length of a rectangular is p, and its width is L, then the linear equation of two variables is p-L = 5																																	–
971.	Part b																																	–
972.	if the first number is m, and the second number is n, then the linear equation of two variables is 3m+2n = 24																																	–
973.	Write down the following statements in the form of the linear equation with two variables.																																	–
974.	a. The sum of two numbers is 20																																	–
975.	b. Two times first number minus three times second number is 5																																	–
976.	Solution part a																																	–

977.	if the numbers are x and y, then the linear equation with two variables is x + y = 20																																–
978.	Part b																																–
979.	if the first number is a and the second number is b, then the linear equation with two variables is 2a-3b = 5																																–
980.	Find the solution set of the equation: 2x-y+4=0 with the x member of collection {-2, -1, 0, 1, 2} and y member of integer, then draw the graph.	√					√			√														√								Find the solution set of the equation: 2x – y + 4 = 0 with x **is** a member of collection {-2, -1, 0, 1, 2,} and y **is** a member of integer then draw the graph.
981.	Solution																																
982.	to determine a pair of x and y in order to meet the equation 2x-y+4=0, follow the following steps.																																–
983.	Thus, the solution set is {(2,0), (-1, 2), (0,4) (1, 6), (2,8)}																																–
984.	Graph solution																																–
985.	**Knowing** the solution set is {(-2,0), (-1,2), (0,4), (1,6), (2,8)}					√																				√							The solution set is {(-2, 0), (-1, 2), (0, 4), (1, 6), (2, 8)}.
986.	Using the ordered pairs as the points of coordinate pair, **then** we will get the following graph.																√									√							Using the ordered pairs as the points of coordinate pair, we will get the following graph.
987.	There are **two equally long pipes.**																																There are **two pipes with the same length.**
988.	The equation of each length is 3x cm and 2x+5 cm																																–

	respectively.																																
989.	Find the length of the pipes.																																–
990.	Solution																																–
991.	equation 3x = 2x+5																																–
992.	3x-2x = 5																																–
993.	thus, for x = 5, 3x = 3. 5 = 15																																–
994.	Then, the length of the pipes is 15 cm																																–
995.	Are you ready for a quiz?																																–
996.	Type your name then press enter																																–
997.	**Given** x-4 = 8, the value of x is…					√																				√							x-4 = 8, the value of x is…
998.	Right answer																																–
999.	For x = members of an interger set, the solution of set 4x+5 = 2x+1 is…																																–
1000	Check answer																																–
1001	right answer																																–
1002	**Given** 3x+2 = 7, the value of x is..					√																				√							Eliminate the word **given**, so that: 3x+2 = 7, the value of x is..
1003.	Given 2(x-3) -3(x+4) = 8, the value of x is…					√																				√							2(x-3) -3(x+4) = 8, the value of x is…
1004.	**Given** 2(x-5)-4(2x-1) = -x-3, the value of x is…					√																				√							2(x-5)-4(2x-1) = -x-3, the value of x is…
1005.	**Given** a + (a+3) + 3(a+4) = 50, the value of x is..					√																				√							a + (a+3) + 3(a+4) = 50, the value of x is..
1006.	**Given** 2x/3 = -4, the value of x is..					√																				√							2x/3 = -4, the value of x is..
1007.	The solution of set 3x-9 = -18 is…																																–
1008.	**Two times** first number subtracted by three times second number is 5.		√						√																√							**Twice of** first number subtracted by three times of second number is 5.
1009.	Write it in the form of a																																–

	linear equation with two variables!																																
1010.	**Given** 2 pipes **of** the same length. Each length is 3x-2 cm and 2x+4 cm respectively.					√			√																√								Two pipes **have** the same length. Each length is 3x – 2cm and 2x + 4cm respectively.
1011.	Determine the sum of the length of the pipes.																																–
1012.	Evaluation result																																–
1013.	number of questions = 10																																–
1014.	right answer = 10																																–
1015.	your total point = 100																																–
1016.	Linear Equation system with two Variables																																–
1017.	The definition of a system of linear equations with two variables is a system of two or more linear equations with two variables.																																–
1018.	To understand a system of linear equations with two variables (SLETV) better, study **at** the illustrations bellow					√																				√							To understand a system of linear equations with two variables (SLETV) better, study the illustration **below.**
1019.	M and N are are variables																																–
1020.	3, 6, 5, and 2 are the coefficients																																–
1021.	SLETV has it normal form																																
1022.	The variables x and y from those two LETVs have the same value, because the values of x and y are a single solving set and those two LETVs are related to each other.																																–
1023.	Comparison between LETV																																–

	and SLETV																																
1024.	It consists of a linear equation with two variables																																–
1025.	it consists of two linear equation with two variables																																–
1026.	It has many solving sets.																																–
1027.	it has single solving set		√																							√							It has **a** single solving set.
1028.	The solving set fulfills one LETV																																–
1029.	its solving set fulfills both SLETV																																–
1030.	The root and not the root of SLETV																																–
1031.	Suppose a system of linear equations with two variables is given as follows:																																–
1032.	If $ax_1 + by_1 = e$ $Cx_1 + dy_1 = f$, The pair of the value $x = x_1$ and $y = y_1$ is the solution or the root of SLETV																																–
1033.	If $ax_2 + by_2 = e$ $Cx_2 + dy_2 \neq f$, The pair of the value $x = x_2$ and $y = y_2$ is not the solution or not the root of SLETV																																–
1034.	If If $ax_3 + by_3 \neq e$ $Cx_3 + dy_3 = f$, The pair of the value $x = x_3$ and $y = y_3$ is not the solution or not the root of SLETV																																–
1035.	If If $ax_4 + by_4 \neq e$ $Cx_4 + dy_4 \neq f$, The pair of the value $x = x_4$ and $y = y_4$ is not the solution or not the root of SLETV																																–
1036.	The meaning of the square root of $x = x_1$ and $y = y_1$ is both of the values, not one of them, so either $x = x_1$ or y																																–

	= y_1 only is not the root of that SLETV																																	–
1037.	Summary																																	–
1038.	A system of linear equations with two variables (SLETV) has two or more united linear equations.																																	–
1039.	Commonly, the SLETV is written as follows:																																	–
1040.	The root or the solution of the SLETV is the values of x and y that fulfill every equation in the SLETV																																	–
1041.	Using the substitution method, find the solution set of each SLETV																																	–
1042.	Solution																																	–
1043.	step 1: change equation (1) into:																																	–
1044.	Step 2 : Substitute equation (3) into equation (2)																																	–
1045.	STEP 3 : Substitute value x = 10 into equation (3), and the value y will be found.																																	–
1046.	Thus, the solution set is {(10, 24)}																																	–
1047.	Determine variables, coefficients, and constants of the following SPLDV																																	–
1048.	Solution																																	–
1049.	a. the variables are x and y.																																	–
1050.	The coefficients of the equation 4x-2y = -2 are 4 and -2																																	–
1051.	The coefficients of the																																	–

	equation x+4y = 5 are 1 and 4																																–
1052.	the constant is 5																																–
1053.	The variables are a and b																																–
1054.	The coefficients of the equation 9a+12b = 42 are 9 and 12																																–
1055.	the constant is 42																																–
1056.	The coefficients of the equation a – 5b = -8 are 1 and -5																																–
1057.	the constant is -8																																–
1058.	Using the elimination method, find the solution set of each SLETV																																–
1059.	Solution																																–
1060.	thus, the solution set is {(3, 4)}																																–
	Using the substitution method, find the solution of each SLETV																																–
1061.	Change any equation (example: equation (1)) by declaring one variable into other variable.																																–
1062.	Equation (1) is changed as follows																																–
1063.	Substitute equation (3) into equation (2)																																–
1064.	Substitute the value y = -1 into equation (3) so that value x will be found.																																–
1065.	Thus, the solution set is {(5, -1)}																																–
1066.	The difference between two																																–

	numbers is two.																															
1067.	If multiplied by 2, the second number is 8 bigger than the first number, find the two numbers.		√	√																					√							If **it is** multiplied by 2 the second number is 8 times bigger than the first number. Find the two numbers.
1068.	If the first number is x, and the second number is y, the mathematics model is …																															–
1069.	Thus, the numbers are 12 and 10.																															–
1070.	Are you ready for a quiz?																															–
1071.	type your name then press enter																															–
1072.	**Given** 2x+y = 11 and x-y = -2, the value of x and y is..					√																			√							2x+y = 11 and x-y = -2, the value of x and y is..
1073.	Wrong answer																															–
1074.	If x, y, are set of interger, then value of x and y to meet 2x + y = 5 is…																															–
1075.	The graph below shows the sets of following equation…																															–
1076.	**Given** x, y are members of set R.					√																			√							x, y are members of set R.
1077.	the solution of the set for the equation 2x + y = 7 and 2x-y = 1 is…																															–
1078.	The solution of the set for the equation 2x + 3y = 10 and 3x-2y = 2 is…																															–
1079.	**Given** the price of 3 thin books and two thick books is Rp. 3.000.					√																			√							The price of 3 thin books and two thick books is Rp. 3.000.

1080.	The price of the three thin books is Rp 750 more expensive than price of one thick book.																															–
1081.	The price of the thick book is..																															–
1082.	The solution of the set for the equation 3x-2y = 1 and 2x + 3y = 18 is..																															–
1083.	The solution set for the linier equation x+y = 5 and x-2y = 14 is…																															–
1084.	A merchant sold 8 mangoes and 12 apples with the price Rp. 4000		√																						√							A merchant sold 8 mangoes and 12 apples with the price **of** Rp.4000.
1085.	He also sold 16 mangoes and 8 apples, with the price Rp 5600		√																						√							He also sold 16 mangoes and 8 apples, with the price **of** Rp.5600.
1086.	The price 1 mango and 1 apple was..																															–
1087.	The price of 15 books and 10 pencils is Rp 7500																															–
1088.	The price of 6 books and 5 pencils is Rp 3150																															–
1089.	What is the price of 3 books and 4 pencils?																															–
1090.	Evaluation Result																															–
1091.	Number of questions																															–
1092.	Right answer																															–
1093.	Your total point																															–
1094.	Are you ready for evaluation?																															–
1095.	Type your name **than** press the enter button.							√																		√						Type your name **then** press the enter button.

1096.	**Given**, at t=12 second, the speed of a motorbike of a racer is 56 m/s.					√																			√										At t=12 second, the speed of a motorbike of a racer is 56 m/s.
1097.	At t=1 minute, the speed becomes 68 m/s.																																		–
1098.	Determine the acceleration of the motorbike?																																		–
1099.	Use the formula V1= V0 + at																																		–
1100.	Your answer is incorrect																																		–
1101.	Find the solution of 3y + 5 = 4y-1 is…																																		–
1102.	Mr. Budi's field is vectangular .																																		–
1103.	**It's** perimeter is 240 m.								√																√										**Its** perimeter is 240 m.
1104.	If the length of the field is twice the width, the area of field is… m^2																																		–
1105.	The sum of two numbers is 25, and their difference is 15																																		–
1106.	The product of two number is…																																		
1107.	Mr cokro has a park.																																		
1108.	**It's** perimeter is 280 m.								√																√										**Its** perimeter is 280 m.
1109.	If its width is 20 m less than the length, the area of the park is… m^2																																		–
1110.	The sum of a number consisting of two digits is 10.																																		–
1111.	If the position of the number is interchanged, then the different of the number is 18 more than the previous one.																																		–
1112.	The number is…																																		–
1113.	Mr Adam bought 2 reams of																																		–

	papers and three type writer ribbons with the price of Rp 78,000																																–
1114.	Mr Ari bought 3 reams of papers and 2 type writer ribbons with the pricw of Rp 87,000																																–
1115.	If Mr Halim bought 1 ream of paper and 1 type writer ribbon, how much did he pay for it?																																–
1116.	Your answer is correct																																–
1117.	The age of a father is 27 year older than his children.																																–
1118.	Seven years later, the sum of their age is 53 years.																																–
1119.	Determine the sum of their age now.																																–
1120.	In the money box, there are 600 five-hundred and one-thousand coins.																																–
1121.	If the sum of the money is 457, 500. 00. Find the number of each type of coin.																																–
1122.	Two years ago, the age of the father was 6 times his child age.																																–
1123.	18 years later, his age was be two times his child age.																																–
1124.	Find out their age now.																																–
1125.	In a wallet there are 25 pieces of five-thousand and ten-thousand paper money.																																–
1126.	The sum of the money is																																–

	200,000,00.																																				
1127.	What is the number of five-thousand paper money?																																				–
1128.	Dinda bought 5 books and 3 pencils at Toko Merah, and the price is price was Rp 19, 250.00.																																				–
1129.	Laras bought 2 books and 1 pencil in the same shop.																																				–
1130.	Their price was Rp. 7,250.00.																																				–
1131.	Yuda bought 4 books and 2 pencils in the same shop and gave the shop assistant a fifty-thousand papaer money.																																				–
1132.	What was the change Yuda received?																																				–
1133.	The perimeter of the rectangular field is 48m.																																				–
1134.	Its length is 6m longer than its width.																																				–
1135.	The area of filed.																																				–
1136.	A 40 kg mixed rice is worth Rp 2,350.00 per kg.																																				–
1137.	The mixed rice consists of two types rice worth the price of Rp. 2,200.00 per kg and 2,500.00 per kg respectively.																																				–
1138.	Find the amount of each type of rice ?																																				–
1139.	Total Question = 14																																				–
1140.	Correct answer = 1																																				–
1141.	Your Score is = 7.14																																				–

Table 5. Phytagorian Theorem

No	Item	Types of Errors																								Causes of Errors								Alternative Corrections
		Overt errors												Covert errors												Inter	Intra	cont	Communication strategies					
		omission			addition			Selection			Ordering			Omission			Addition			Selection			ordering											
		M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S				Av	Pr	Co	Ap	La	
1142.	Pythagorean Theorem																																	–
1143.	**Langkah 1 langkah 2 langkah 3 langkah 4 langkah 5**								√																								√	**step 1 step 2 step 3 step 4 step 5**
1144.	What can you conclude?																																	–
1145.	Is each shape a triangle?																																	–
1146.	Is each shape a right triangle?																																	–
1147.	How to determine the length of hypotenuse of the right triangle?																																	–
1148.	Can Pythagorean theorem be used to determine it?																																	–
1149.	Discovering theorem																																	–
1150.	Discovering the Pythagorean theorem version 1																																	–
1151.	Rayhan is playing on the wet ground.																																	–
1152.	His feet tracks as shown in the following figure.																																	–
1153.	he moves from A to B 8 steps, and then to C 6 steps.																																	–
1154.	How many steps must he move if he moves straight from A to C without turning?																																	–
1155.	If one square unit represents one step that																																	–

	Rayhan makes, then his trip can be easily sketched on a piece of grid paper as follows.																															
1156.	To calculate how many steps Rayhan has to move from A straight to C, we can use another piece of grid paper.																															–
1157.	Click the following simulation button.																															–
1158.	Using the following figure, now we can add a square to each side.																															–
1159.	Click the following simulation button.																															–
1160.	Look carefully at the result of simulation!																															–
1161.	What can you conclude?																															–
1162.	Is the sum of the squared length of the right sides **is** equal to the squared length of the hypotenuse?					√																				√						Is the sum of the squared length of the ride sides equal to the squared length of the hypotenuse?
1163.	Look carefully at the result of the simulation above!																															–
1164.	It can be concluded that the sum of the areas of two small squares is the same as the area of the largest square.																															–
1165.	Conclusion																															–
1166.	What do you think of the following conclusion?																															–
1167.	In a right triangle, the sum of the square length of the right sides is equal to the																															–

	square length of the hypotenuse.																																–
1168.	The above conclusion is called the Pythagorean theorem.																																–
1169.	Discovering Pythagorean theorem version 2																																–
1170.	Look carefully at the following square.																																–
1171.	We will find the area of the square using 2 different methods.																																–
1172.	Finding the area of the square using method 1																																–
1173.	Total area = area I + area II + area III + area IV + area V																																–
1174.	Finding the area using method 2																																–
1175.	The area of the square = $(a+b)^2$																																–
1176.	The equation to find the area of the square using method 1 and method 2 can be used to prove Pythagorean theorem																																–
1177.	The area of the square using method = the area of the square using method 2.																																–
1178.	Discovering the Pythagorean theorem version 3.																																–
1179.	Look carefully at the following square.																																–
1180.	We will prove Pythagorean theorem using the square.																																–
1181.	The area of the square is equal to the sum of the																																–

	areas of the shapes inside the square.																																–
1182.	The following equation is to prove the Pythagorean theorem.																																–
1183.	Exercise																																–
1184.	Example																																–
1185.	1. Solve the following problems:																																–
1186.	a. three different right triangles ABC as follows: AB = 3 units																																–
1187.	BC = 4 units																																–
1188.	AB = 5 units																																–
1189.	BC = 12 units																																–
1190.	AB = 9 units																																–
1191.	BC = 12 units																																–
1192. 1193.	b. Find the length of each side of the above triangles.																																–
1194.	Put the result in the following table.																																–
1195.	c. Click the button to check the answer																																–
1196.	look carefully at the table.																																–
1197.	what you can conclude?																																–
1198.	2. Calculate the length of the diagonal of the following rectangle.																																–
1199.	3. Look at the sailboat on the picture carefully!																																–
1200.	If it is known that t = 4m, a = 3m, and b = 0,5m.																																–
1201.	a. **How much** is the								√																			√						**Wha**t is the perimeter of saik on the picture?

	perimeter of sail on the picture?																																
1202.	b. **How much** is the area of sail?							√																		√							**What** is the area of sail?
1203.	4. Look at the pyramid on the right side!																																–
1204.	if it is known that the pyramid is a right angled triangle and the length of its foot is 100m, **how much** is the length of its below side?							√																		√							If it is known that the pyramid is a right angled triangle and the length of its foot is 100m, **what** is the length of its below side?
1205.	5. Look at the picture of house carefully!																																–
1206.	If it is known that it is a right field triangle, and t = 1,2m and a = 3,2m.																																–
1207.	calculate:																																–
1208.	a. **How much** is the length if its hypotenuse?							√																		√							**What** is the length of its hypotenuse?
1209.	b. bis the area of triangle?							√																		√							**What** is the area of triangle?
1210.	Quiz																																
1211.	The followings are the length of the sides of triangles.																																–
1212.	Which ones are the lengths of the sides of right triangle?																																–
1213.	Your answer is wrong																																–
1214.	The perimeter of the structure below is ...																																–
1215.	The area of the following figure is ...																																–
1216.	A triangle A, B, C is shown at the figure.																																–
1217.	The followings are the formula of pythagoras,																																–

	except ...																																	
1218.	Your answer is **true**																			√					√								Your answer is **correct.**
1219.	Look carefully at the following figures																																–
1220.	There is a car running to reach a place that is 2 meters high.																																–
1221.	What is the distance that the car must take to reach that place?																																–
1222.	number of items = 5																																–
1223.	Correct answer = 1																																–
1224.	Score = 20																																–
1225.	Phytagorean theorem																																–
1226.	Phytagorean formula																																–
1227.	Phytagoras (564 – 475 BC) was a Greek philosopher who developed math, astronomy, and musical theorem.																																–
1228.	Phytagorean theorem is the most outstanding work of Phytagoras.																																–
1229.	The theorem stated that In a right triangle, the sum of the square length of the right sides is equal to the square length of the hypotenus.																																–
1230.	The Phytagorean theorem can also be represented in the formula form.																																–
1231.	Look carefully at the following figure.																																–
1232.	Δ ABC is a right triangle.																																–
1233.	the right sides are a and b.																																–

1234.	One side opposite the right angle, called hypothenuse is c.																																–
1235.	The relation between $c^2 = a^2 + b^2$ that is called Phytagoras formula																																–
1236.	**Conclution:** Formula to calculate the length of **hypothenuse its**																√			√						√							**Conclusion:** Formula to calculate the length of **hypotenuse is ...**
1237.	The above equation is called Phytagorean formula																																–
1238.	Exercise																																–
1239.	Examples																																–
1240.	1. Calculate the lengths of sides a, b, and c of the following right triangle																																–
1241.	the length of side a = ...cm																																–
1242.	The length of side b = ...m																																–
1243.	The length of side c = ...m																																–
1244.	Problem solving:																																–
1245.	2. Calculate a perimeter of the following kite																																–
1456.	The perimeter of the kite is ...cm																																–
1457.	3. Based on the map, Kalimantan Tengah consists of 3 cities, namely Kasongan, Sampit, and Bukitrawi																																–
1458.	Tono will travel to those 3 cities by car																																–
1459.	It takes 1 liter of gasoline to reach 12 km																																–
1460.	a. How much gasoline																																–

	(liter) is needed by Tono to travel from Sampit to Bukitrawi?																																–
1461.	....liters gasoline																																–
1462.	b. How much gasoline (liter) is needed by Tono to travel from Sampit to Bukitrawi via Kasongan?																																–
1463.	....liters gasoline																																–
1464.	4. How to measure the width of the river on the picture below?																																–
1465.	We can use the Pythagorean theorem to solve the problem																																–
1467.	5. If it is known that the height of plane when it takes off is 2.500 m and the distance on the ground from the take off point is 6.000, calculate the length of its track when it takes off																																–
1468.	The length of take-off track is ...m																																–
1469.	Quiz																																–
1470.	1. Calculate the diagonal length of the area A G of the cuboid ABCD EFGH as follows:																																–
1471.	2. Look carefully at the following figure																																–
1472.	There are 2 right triangles as																																–

	shown at the figure.																																
1473.	Calculate the length of A to B?																																–
1474.	3. Look at the following figure of a plane!																																–
1475.	The plane takes off from A to B.																																–
1476.	Calculate the length of A to B?																																–
1477.	4. Mr. Sitorus has a rectangle garden that will be planted vegetables like the picture beside.		√																						√								Mr. Sitorus has a rectangle garden that will be planted **with** vegetables like the picture beside.
1478.	how much fertelizer should he buy if one square meter needs 0.5 kilograms of fertilizer?																																–
1479.	5. Look at the picture of a windmill beside																																–
1480.	Its laths are in the form of isosceles triangles in which its base and perpendicular is 5 meters.																																–
1481.	How long is A-B?																																–
1482.	number of items = 5																																–
1483.	correct answer = 0																																–
1484.	score=0																																–
1485.	Triples Phytagorean																																–
1486.	In the left side, there is a right triangle with side a and b.																																–
1487.	the hypothenuse is c																																–
1488.	According to Phytagorean Formula, $c^2 = a^2 + b^2$																																–

1489.	If we take n and m, where n > m, we can find side a by using the formula $a^2 = n^2 + m^2$ and the length of side b = 2 x n x m.																																		–
1490.	Side c can be found by equation $c^2 = n^2 + m^2$.																																		–
1491.	The result of that equations, namely a, b, and c is called Triples Phytagorean.																																		–
1492.	If n = 4, m = 2 find a, b, and c as result of the equation of a triangle as shown in the left side?																																		–
1493.	The result of a, b, and c from the above equation are natural number.																																		–
1494.	Please calculate a,b, and c using phytagorean formula.																																		–
1495.	Are the results the same?																																		–
1496.	Conclusion																																		–
1497.	What conclusion can you make after learning this topic?																																		–
1498.	Is your conclusion the same as the following conclusion?																																		–
1499.	If a, b, and c are the length of sides of the right triangle, in which a, b, and c are natural numbers, then a, b, and c are Triples Phytagorean																																		–
1500.	Exercise																																		–
1501.	Examples																																		–
1502.	1. A right triangle ABC has																																		–

	length right sides a and b.																																
1503.	The hypothenuse is c																																–
1503.	a, b, and c are natural numbers.																																–
1504.	complete the table below!																																–
1505.	Using the equations discussed previously to find the model of Triples Phytagorean.																																–
1506.	2. The lengths of the sides of a right triangle are 6 cm, 11 cm, and 14cm respectively																																–
1507.	Find the hypothenuse and its square															√													√				Find the hypotenuse and its square.
1508.	Find the sum of the squared sides?																																–
1509.	Compare the result of point a and b																																–
1510.	What kind of triangles ABC?	√																							√								What kind of triangle **is** ABC?
1511.	Are the lengths of sides 6 cm, 11 cm, and 14cm triples phytagorean numbers?																																–
1512.	Explain in more details!																																–
1513.	3. Lengths of each lateral of a triangle are known below.																																–
1514.	What kind of triangle are they?																																–
1515.	In which model of triangle they belong to?	√																							√								In which model of triangle **do** they belong to?
1516.	Are they acute triangle,																																–

	obtuse triangle, or right angled triangle?																																–
1517.	Fill in the blanks: A for acute triangle																																–
1518.	O for obtuse triangle																																–
1519.	R for right-angled triangle?																																–
1520.	Quiz																																–
1521.	Which of the following numbers are triple Phytagorean?																																–
1522.	Your answer is correct																																–
1523.	If the lengths of sides of a triangle 6cm, 8cm, and 10cmrespectively, what kind of triangle is it																																–
1524.	A right triangle																																–
1525.	An acute triangle																																–
1526.	An obtuse triangle																																–
1527.	An equilateral triangle																																–
1528.	There is an ABC triangle in which AB = 5cm, BC = 6cm, and AC = 4 cm.																																–
1529.	So, ABC is called ...																																–
1530.	An angled triangle																																–
1531.	An acute angled triangle																																–
1532.	Amblygon triangle																																–
1533.	equilateral triangle																																–
1534.	Amblygon triangle																																–
1535.	An ABC triangle with AB = 5 cm, BC = 6 cm, and AC = 10 cm is included as ...																																–
1536.	An angled triangle																																–
1537.	An acute angled triangle																																–
1538.	equilateral triangle																																–
1539.	A triangle that has the same																																–

	base and perpendicular is called ...																																
1540.	Number of items = 5																																–
1541.	Correct answer = 1																																–
1542.	Score = 20																																–
1543.	Evaluation																																–
1544.	Are you ready for Evaluation?																																–
1545.	Type your name then press the enter button																																–
1546.	Which one are laterals of a right angled triangle																																–
1547.	Your answer is correct																																–
1548.	The area of trapezoid is ...																																–
1549.	if the length of right-side laterals of right-angled triangle KLM are 4cm and 6cm, the length of its hypothenuse is ...																																–
1550.	Here are laterals of some triangles																																–
1551.	Which **one ore** laterals of an acute triangle ...	√																							√							Which **ones are** laterals of an acute triangle....
1552.	The space diagonal DF of **cuboind** ABCD EFGH is ...																		√									√				The space diagonal DF of **cuboids** ABCD EFGH is....
1553.	Laterals of a triangle are known here.																																–
1554.	Find out whether it is an acute, a right-angled, or an obtuse triangle																																–
1555.	Determine the lengths of e ...																																–
1556.	Mr. Budi has a field like shown on the picture.							√																	√							Mr. Budi has a field as shown **in** the picture.
1557.	Corn will be planted on that																																–

	field.																																	–
1558.	Every meter square needs 5 grams of corn seed.																																	–
1559.	1 kg seed is Rp 7.000,00																																	–
1560.	How much money should Mr. Budi pay to buy the seed for his field?																																	–
1561.	Look at the picture carefully.																																	–
1562.	calculate the length of the sloping road.																																	–
1563.	Roof a room is covered by square ceilings, and the length of its lateral is 1 meter.																																	–
1564.	Calculate the distance of lamp A and lamp B by using the Phytagorean Theorem in the closest centimeter.																																	–
1565.	Ardi wants to make a kite.																																	–
1566.	Help him to make a perfect kite by calculating the length of x and y																																	–
1567.	Look at the picture carefully!																																	–
1568.	Two planes are over a house.																																	–
1569.	The radar station is 8 km away from the house.																																	–
1570.	The station accepts signals from both planes in the distanceof 9 km and 10 km.																																	–
1571.	Calculate the height difference of both planes (summarize in closest meter)																																	–
1572.	Total question = 12																																	–

1573.	Correct answer = 7																															–
1574.	Your score is 58,3																															–
1575.	Click for additional Question (essay)																															–
1576.	Determine the length of: (i) xy (ii) y_2																															–
1577.	Calculate the length of x_2 , summarize in two decimal.																															–
1578.	Look at the tent carefully!																															–
1579.	The front side of a tent is a triangle. Calculate the length of BC, AB																															–
1580.	Tania's father is **constrcuting** the storehouse's foundation																				√							√				Tania's father is **constructing** the storehouse's foundation.
1581.	Its outside laterals should be 3,5 m and 2,5 m.																															–
1562.	How to determine that the foundation in a rectangle palm	√																							√							How to determine that the foundation **is** in a rectangle palm.
1583.	Before **construct** the door, Jupri checks whether the door is in rectangle form.	√																							√							Before **constructing** the door, Jupri checks whether the door is in rectangle form.
1584.	Is the angle SPQ right-angled?																															–
1585.	Which side would he check to know that the edge of the door is rectangle?																															–
1586.	**how much should the lengths?**	√						√																√							**What should the length be?**
1587.	It is shown that A (1, 1), B (11, 1), and C (9, 5) make a right-angled triangle																															–
1588.	Draw the points																															–
1589.	Calculate the length of AC																															–

	BC																																	
1590.	Is the expression true? (That the triangle is right-angled)																																–
1591.	start from A, take a walk 120 m to the east side to B.																																–
1592.	And then to the north side 90 m until the tower foot, which is C.																																–
1593.	There is a gold (N) 100m above you.																																–
1594.	Write down all the scales in the picture																																–
1595.	calculate: distance from A to N, summarize in one decimal																																–

Table 6. Circle

No	Item	Types of Errors																								Causes of Errors								Alternative Corrections
		Overt errors												Covert errors												Inter	Intra	Cont	Communication Strategies					
		omission			addition			Selection			Ordering			Omission			Addition			Selection			ordering						Av	Pr	Co	Ap	La	
		M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S									
1596.	Circle and **The** Elements																		√												√			Circle and **its** elements
1597.	Circumference and Area of Circle																																	-
1598.	Central Angle, Arc and Sector																																	-
1599.	Incircle and Circumcircle																																	-
1600.	Tangent Of Circle																																	-
1601.	Evaluation																																	-
1602.	What is Circle?		√																								√							What is **a** circle?
1603.	Circle and the elements of circle																																	-
1604.	Sub topics :																																	-
1605.	1. Definition of circle																																	-
1606.	2. The elements of circle																																	-
1607.	Select the sub menu to learn more																																	-
1608.	Look at a picture below																																	-
1609.	Many objects surrounding us are in the form of a circle.																																	-
1610.	A circle is a set of points in a plane that are the same distance from a fixed point																																	-
1611.	Radius																																	-
1612.	A radius is the length of a straight line **drown** from the centre of a circle to a point on its circumference																	√													√			A radius is the length of a straight line **drawn** from the centre of a circle to a point on its circumference.

1613.	A notation of radius of a circle is r																																	-
1614.	Observe the following picture, and press the simulation button																																	-
1615.	Line OA and OB or the radius of a circle is represented by r																																	-
1616.	The length of OA = the length of OB																																	-
1617.	Diameter																																	-
1618.	A diameter is a chord that passes through the center of the circle																																	-
1619.	A notation of a diameter is d.																																	-
1620.	Look at the figure on the right, and press the simulation button																																	-
1621.	AB is the diameter of the circle O																																	-
1622.	Notice that AB = AO + OB and AO = OB = r																																	-
1623.	AB = 2r																																	-
1624.	Arc																																	-
1625.	An arc is a curving line that is part of circle																																	-
1626.	The notation of arc is ∩																																	-
1627.	Look at the figure on right and the simulation button																																	-
1628.	Arc ABC (or ∩ ABC) is an arc of circle L																																	-
1629.	Arc ABC is bounded by point A and C at circle L																																	-

1630.	Chord																															-
1631.	A chord is a line that joins two points on the circumference of a circle																															-
1632.	PQ is a chord																															-
1633.	Find the other chords the simulation button																															-
1634.	Segment of the circle																															-
1635.	A segment is a part of a circle that is between a chord and the circumference.																															-
1636.	Look at the figure on the right, and press the simulation button																															-
1637.	The segment DEF is bounded by the chord DF and the chord DEF																															-
1638.	The figure DEF is the segment in circle L																															-
1639.	Sector of Circle					√																										-
1640.	The region inside a circle **which** is bounded by two radiuses and an arc of the circle.				√																				√							The region inside a circle is bounded by two radiuses and an arc of the circle.
1641.	Look at the figure on the right, and press the simulation button																															-
1642.	Sector bounded by radius ML and NL, and arc MN is sector MNL																															-
1643.	**Apotem**	√																							√							**Apothem**
1644.	**Apotem** is the shortest distance between a chord												√												√							**Apothem** is the shortest distance between a chord and the centre of

	and the centre of a circle.																																a circle.
1645.	Look at the figure on the right, and press the simulation button																																-
1646.	LR is the **apotem** of chord PQ.												√													√							LR is the **apothem** of chord PQ.
1647.	The characteristics of an **apotem** of a chord																																The characteristics of an **apothem** of a chord.
1648.	An **apotem** is perpendicular to a chord LR is perpendicular to PQ																																An **apothem** is perpendicular to a chord LR is perpendicular to PQ.
1649.	An **apotem** divides a chard in to two lines in the same length																																An **apothem** divides a chard in to two lines in the same length.
1650.	The length of PR = the length of RQ.																																-
1651.	Quiz of Circle																																-
1652.	Are you ready for taking quiz?																																-
1653.	Type your name, then press Enter																																-
1654.	Look at the figure on the right!																																-
1655.	PA = PB = PC = PG is…																																-
1656.	Your answer is wrong																																-
1657.	The **chord** of a circle on the right are…	√																								√							The **chords** of a circle on the right are…
1658.	Your answer is right																																-
1659.	The shaded area AOC on the right figure is called…																																-
1660.	Of the following statements, **which** the right one is…					√																				√							Of the following statements, the right one is…
1661.	The length of a diameter is $\frac{1}{2}$ radius																																-

1662.	A triangle that is formed by pairs of a radius and a chord is always equilateral																																-
1663.	A sector is sector of circle bounded by pairs of radius																																-
1664.	Sector is a part of segment of the circle																																-
1665.	A segment passing through center of circle that is connecting two points at circle is…																																-
1666.	Total of Questions = 5																																-
1667.	Right answers = 1																																-
1668.	Your score is = 20																																-
1669.	Circumference and area of circle																																-
1670. 1671.	Circumference																																-
1672.	Circumference is distance around closed curve																																-
1673.	Look at the figure on the right and press the simulation button																																-
1674.	A number of 7 units in the diameter of a circle is **a** cut at point A.					√																				√							A number of 7 units in the diameter of a circle is cut at point A.
1675.	The curve circle straightened, so we can get a straight line AA'		√																							√							The curve circle **is** straightened, so we can get a straight line AA'.
1676.	The length of AA' is measured, and we get 22 units.																																-
1677.	Finding value of π (read : phi)																																-
1678.	Find objects in your surrounding that are in the																																-

	form of circles																																
1679.	Measure their diameters and circumferences																																-
1680.	Record the result of your measurements in the provided spaces																																-
1681.	Then press the picture below																																-
1682.	Diameter =																																-
1683.	circumference =																																-
1684.	the value of π =																																-
1685.	If you **measured** accurately, **then** you will find that the value of ‘ is close to 3,14 or $\frac{22}{7}$				√	√																				√							If you **measure** accurately, you will find that the value of ‘ is close to 3,14 or $\frac{22}{7}$.
1686.	The formula of circumference																																-
1687.	Based on figure 1, the formulation of circumference is as follows																																-
1688.	K = πd																																-
1689.	K= circumference																																-
1690.	r = radius of circle																																-
1691.	d = diameter																																-
1692.	π = 3,14 atau $\frac{22}{7}$																																-
1693.	Determine the circumference of a circle if the radius of a circle is :																																-
1694.	The circumference with r = 14 cm is…																																-
1695.	Thus, the circumference is 88 cm																																-
1696.	The circumference with r = 30 cm is…																																-

1697.	thus, the circumference is 188,4 cm																															-
1698.	Area of circle																															-
1699.	Area of a circle is an area inside circle																															-
1700.	Study the figure on the right, and press the simulation button																															-
1701.	The shaded region **on** orange on the figure is the area of the circle																		√					√							The shaded region **in** orange on the figure is the area of the circle.
1702.	To determine the area of a circle, we can do it by:																															-
1703.	Calculating the area of a circle **with** counting **the square of units.**							√			√													√							Calculating the area of a circle **by** counting **the unit of squares.**
1704.	Calculating the area of a circle using the formula																															-
1705.	Area of circle																															-
1706.	Study the example of determining the area of a circle by counting the square of units as shown in the figure on the right																															-
1707.	We can find 49 full squares																															-
1708.	12 squares, **whose areas are half of square or more**																			√				√							12 areas, **with areas of half of square or more.**
1709.	Thus, the area of the circle is close to 62 cm^2																															-
1710.	Calculating the area of a circle using the formula																															-
1711.	Press the simulation button, and study the picture on the right																															-
1712.	The length of AB = the																															-

	length of arc AB = $\frac{1}{2}$ x circumference																																
1713.	Width BC = radius of circle = r																																-
1714.	Thus, the area of a rectangle is = the area of a circle																																-
1715.	The area of a rectangle = AB x BC																																-
1716.	Thus, the area of a circle is $\pi.r^2$																																-
1717.	Determine the area of a circle with the following radius :																																-
1718.	The area of a circle with r = 7 cm is…																																-
1719.	Thus, the area of a circle is 154 cm^2																																-
1720.	The area of a circle with r = 10 cm is …																																-
1721.	Thus, the area of a circle is 134 cm^2																																-
1722.	Are you ready for Quiz?																																-
1723.	type your name, then press enter button																																-
1724.	A diameter of a circle is 14 cm . its circumference is…																																-
1725.	Your answer is right																																-
1726.	Some roses planted in a garden are in the form of a circle																																-
1727.	**A** diameter of garden is 63 cm																			√						√							**The** diameter of the garden is 63 cm.
1728.	The distance between two **closer** roses is 3m																																The distance between two closest roses is 3 m.
1729.	If $\pi = \frac{22}{7}$, **then** the total		√			√																			√								If $\pi = \frac{22}{7}$, the total number **of** roses

| | | |

1745.	What can you say about the spokes of the wheel?																																-
1746.	Press the simulation button																																-
1747.	If you notice the spokes carefully, they meet at one central point and form an angel																																-
1748.	What kind of angle is it?																																-
1749.	What is the size of the angle ?																																-
1750.	Understanding central angles and -circumference angels																																-
1751.	Press the simulation button and look at the picture of a circle on the right																																-
1752.	Point O is central point of the circle																																-
1753.	Angle BOA is the central angel because its angle point is in the centre of a circle																																-
1754.	Compare with **angel** BKA																								√					√			Compare with **angle** BKA.
1755.	The angle point BKA is in the arc of the circle																																-
1756.	Then, angle BKA is a circumference angle																																-
1757.	A central angle is an angle formed by two radii facing an arc of a circle																																-
1758.	A circumference angle is an angle formed by two chords that are intersecting at a																																-

	circle circumference																																	
1759.	Press the simulation button and study to the picture on the right.																																-
1760.	Angle BOC is a central angle																																-
1761.	Angel BAC is a circumference angle																																-
1762.	The characteristics of central angles and circumference angles																																-
1763.	The measure of a circumference angle is a half of central angle, if both angels face the same arc																																-
1764. 1765.	Study the picture on the right and press the simulation button																																-
1766.	2 Angle BAC = angle BEC																																-
1767.	or angle BAC = $\frac{1}{2}$ angle BEC																																-
1768.	The circumference angels that face arc have the same measure of angle																																-
1769.	Press the simulation button and study the picture on the right																																-
1770.	angle ABC and ADC face the same arc AC																																-
1771.	Evidence																																-
1772.	Angle ABC = half of angle ALC																																-
1773.	Angle ADC = half of angle ALC																																-
1774.	It means that angle ABC = angle ADC																																-

1775.	Study the picture on the right and press the simulation button																																			-
1776.	Angle PLQ = angle RLS, then																																			-
1777.	The length of arc PQ = length of arc RS																																			-
1778.	Evidence :																																			-
1779.	The length of arc PQ = 5 units																																			-
1780.	The length of arc RS = 5 units																																			-
1781.	It means that the length of arc PQ = the length of arc RS																																			-
1782.	The measure of a circumference angle that faces a half circle (a diameter of a circle) is 90° (right angle)																																			-
1783.	Study the picture on the right, and press the simulation button																																			-
1784.	AB is the diameter of circle L, then angle ALB = 180°																																			-
1785.	The total measure of a perioon																																			-
1786.	If the measure of a straight line is 180°, what is the measure of a perioon (one revolution)																																			-
1787.	Study the picture on the right, and press the simulation button																																			-
1788.	The measure of angle AOB is180°, because it is a straight line.																																			-

1789.	The measure of angle BOA is 180° too																															-
1790.	Thus, the measure of a perioon (one revolution) is 180° + 180° = 360°																															-
1791.	The relationship among a central angle, a sector area, and length of arc.																															-
1792.	To determine the relationship, press the simulation button, and study the picture on the right.																															-
1793.	The length of arc US = 3 **the times length** of arc RT, so that we find ratio :										√													√							The length of arc US = 3 **times the length** of arc RT, so that we find ratio :
1794.	The area of sector PUS = 3 **the times of sector** PRT, so that we find ratio :										√													√							The area of sector PUS = 3 **times of sector** PRT, so that we find ratio :
1795.	Size of central angle SPU = 3 times the measure of angle RPT, so that we find ratio :																															-
1796.	The ratio of sector area = the ratio of central angle = the ratio of the length of arc.																															-
1797.	The relationship among a central angle, a sector area, a length of arc, and an area of segment of the circle																															-
1798.	For two sectors of more of a circle whose measures are the same as the picture on the right, then																															-
1799.	Are you ready for taking																															-

	quiz?																															
1800.	Type your name **than** press enter button							√																	√							Type your name **then** press enter button.
1801.	b the circumference of a circle is 314 cm, the measure of POQ = 72 and ‘ = 3,14		√																					√								The circumference of a circle is 314 cm, the measure of POQ = 72 and ‘ = 3,14 **is**...
1802.	The area of sector OPQ is… (2003)																															-
1803.	Your answer is wrong																															-
1804.	Look at the **oicture** on the right																			√									√			Look at the **picture** on the right.
1805.	The measure of ADE = 70 , the measure of BD = 56, size of ACE is..																															-
1806.	Your answer is right.																															-
1807.	The area of a segment of the circle is…																															-
1808.	On the chords PQRS of the rectangle **on the rectangle** on the right figure, **given** P = 83 and Q = 27					√	√																	√								On the chords PQRS of the rectangle on the right figure, P = 83 and Q = 27.
1809.	The measure of angle S is …																															-
1810.	The **a** area of a segment **rea of segmen**t of the circle which is given blue color in the picture above is..					√	√																						√			The **area of a segment** of the circle which is given blue color in the picture above is..
1811.	Result																															-
1812.	Total Question = 5																															-
1813.	Right Answer = 1																															-
1814.	Your Score is 20																															
1815.	Incircle and Circumcircle																															-
1816.	Drawing inside and outside																															-

	circle of triangle																																			
1817.	Select the sub menu to learn more																																			-
1818.	Subtopics: understanding of inside and outside circle of triangle																																			-
1819.	In circle																																			-
1820.	study the picture of a triangle on the left, and press the simulation button																																			-
1821.	In the picture, the circle with central O is an inscribe circle of triangle PRQ.																																			-
1822.	The central point of the circle is the intersection of three points of angle triangle PRQ																																			-
1823.	An inscribe circle of triangle is a circle that touches the three points of a triangle																																			-
1824.	Drawing a triangle inside a circle																																			-
1825.	How to draw a triangle inside a circle?																																			-
1826.	Do the following steps																																			-
1827.	Draw triangle SRP by pressing point P																																			-
1828.	Draw bisector angle RSP by pressing point S																																			-
1829.	Draw bisector angle PRS by pressing point R																																			-
1830.	Draw bisector angle RPS by pressing point P																																			-
1831.	Draw a perpendicular line of																																			-

	side RP with point O, press point O																																-
1832.	Draw a circle with centre O, press point O																																-
1833.	Study the picture of the triangle on the left, and press the simulation button																																-
1834.	In the picture on the left, a circle with centre at P is an outer circle of triangle ABC																																-
1835.	The central point is the intersection of three axle lines of the triangle slides																																-
1836.	The outer circle of a triangle is a circle passing through three vertexes of the triangle																																-
1837.	Drawing a circumcircle																																-
1838.	How to draw a circumcircle?																																-
1839.	Draw triangle ABC by pressing point A																																-
1840.	Draw an axis AB by pressing point B																																-
1841.	Draw an axis AC by pressing point A																																-
1842.	Draw an axis BC by pressing point C																																-
1843.	Draw a radius by pressing point P																																-
1844.	Draw a circle by pressing point P																																-
1845.	Tangent of circle																																-
1846.	Sub topics : definition of circle tangent																																-

1847.	Tangent of two circle																																-
1848.	The characteristics of circle tangent																																-
1849.	Select the sub menu to learn more																																-
1850.	A tangent of a circle																																-
1851.	Understanding a tangent of a circle																																-
1852.	In the daily life, we often see many objects in the form of circles that touch **with** other objects					√																				√							In the daily life, we often see many objects in the form of circles that touch other objects.
1853.	For instance, a pulley to take water from a well, wheels of train, chain of bicycle, and soon																																-
1854.	The objects can be illustrated as a circle and its trace in the form of line																																-
1855.	The line is called a tangent of a circle, and its point is called the point of a circle tangency																																-
1856.	Study the picture on the left																																-
1857.	Line AB and line DC are diameters of circles, and line g coincides with line DC																																-
1858.	If line g is moved to the right or to the left in the position that is always parallel with DC, then position of line g will intersect the circle just at one point																																-

1859.	It is on the right **the** position of point A, or on the left position of point B					√																				√							It is on the right position of point A, or on the left position of point B.
1860.	Therefore, line g is called as a tangent, and point A and point B are points of tangencies																																-
1861.	A tangent of a circle is a line that intersects circle just at one point, and is perpendicular with its radius																																-
1862.	Properties of tangent of circle																																-
1863.	Every tangent of circle is always perpendicular with its radius and diameter that **pass** through point of tangency.	√																								√							Every tangent of circle is always perpendicular with its radius and diameter that **passes** through point of tangency.
1864.	Look at circle O with line i.																																-
1865.	It is tangent of circle at point A																																-
1866.	Through one point at a circle, we can only make one tangent of a circle at the circle																																-
1867.	Through one point at the outside of a circle, we can make two tangents of circle																																-
1868.	**Given** circle O, and point P that is located is outside the line					√																				√							Circle O, and point P are located outside the line.
1869.	Through point P, we can make tangent PS with point S at the circle and tangent PQ with point Q at the																																-

	circle.																															
1870.	Look at the picture of two circles with a centre P and O																															-
1871.	The length PA = r1, and BO = r2		√																						√							The length **of** PA = r1, and BO = r2.
1872.	AB is the tangent of inner common																															-
1873.	Line of AB is parallel with line SO																															-
1874.	The length of AB = SO, then																															-
1875.	If : the length of AB = a, the length of PO = b, then $a^2 = b^2 - (r1 + r2)^2$																															-
1876.	Look at the picture of two circles with P and O as the center on the left P and O,																															-
1877.	The length of PA = r1 and BO = r2																															-
1878.	AB is outer common tangent of OB = NO																															-
1879.	Length AB = NO, then		√																						√							Length **of** AB = NO, then
1880.	If: the length of AB = a, the length of PO = b, then																															-
1881.	Example 1																															-
1882.	Two circles with the centre at P and O, each of their radii are 4 cm and 2 cm																															-
1883.	If the distance of P to O is 10 cm, determine the length of the tangent of inner common.																															-
1884.	Answer : ……. Cm																															-
1885.	Given :																															-
1886.	Radius with the centre at P =																															-

	4 cm, then r1 = 4 cm																															
1887.	Radius with centre at O = 2 cm, then r2 = 2 cm																															-
1888.	The distance of two circle centers = 10 cm , then PO …																															-
1889.	The length of tangent of inner common AB = y cm																															-
1890.	Line AB parallel with line SO, then		√																							√						Line AB **is** parallel with line SO, then
1891.	The length AB = SO, then																															-
1892.	Thus, length of tangent inner common = 8 cm																															-
1893.	Example 2																															-
1894.	Two circles with a centre at P and O																															-
1895.	Each of their radii are 9 cm and 3 cm																															-
1896.	If the distance of P to O is 12 cm , determine the length of the tangent of outer common																															-
1897.	Given :																															-
1898.	Radius with the centre at P = 9 cm, then r1 = 9 cm																															-
1899.	Radius **wuth** the centre at O = 3 cm, then r2 = 3 cm																			√									√			Radius **with** the centre at O = 3 cm, then r2 = 3 cm.
1900.	The distance of two circle centers = 12 cm , then PO …																															-
1901.	The length of the tangent outer common AB = y cm																															-
1902.	Line AB parallel with line NO **maka**		√						√																	√					√	Line AB **is** parallel with line NO, **so that…**
1903.	The length AB = NO, then		√																							√						The length **of** AB = NO, then

1904.	Thus, length of tangent outer common = 10,4 cm																																		-
1905.	The length of the tangent of a circle																																		-
1906.	Calculate the length of the tanget of a circle :																																		-
1907.	To calculate the length of a tangent of a circle at point B, $AB^2 = PA^2 – PB^2$ (rule of Pythagorean)																																		-
1908.	Look at the picture on the right.																																		-
1909.	AB is a tangent																																		-
1910.	The length of radius = 6cm , and length of PB = 10 cm																																		-
1911.	Determine the length of tangent AB																																		-
1912.	Answer = ……. Cm																																		-
1913.	Suppose, the length of AB = y cm																																		-
1914.	Triangle BAP is a right angle at A, then :																																		-
1915.	Thus, the length of tangent is 8 cm																																		-
1916.	Are you ready for quiz ?																																		-
1917.	Type your name, then press enter																																		-
1918.	**Given** two circles with the center at A and B					√																				√									Two circles with the center at A and B.
1919.	Each of their radii are 34 cm and 10 cm																																		-
1920.	Line CD is the tangent of outer common																																		-
1921.	If line CD = 32 cm, the length of AB is…																																		-

1922.	Your answer is wrong.																																-
1923.	Two circles with each radius of 7 cm and 1 cm																																-
1924.	If the distance of circle centers is 10 cm, then the length of the tangent outer common of both circles is …																																-
1925.	Study to the picture bellow.					√																				√							Eliminate the word **to**, so that: Study the picture below.
1926.	If the length of AB = 3 cm, then the length of common tangent CD is…																																-
1927.	The length of the tangent outer common CD is 16 cm																																-
1928.	If the length of AB = 20 cm, and BC = 4 cm, then the length of AD is …																																-
1929.	**Given** two circles with the radii of 11 cm and 3 cm with the center at M					√																			√								Two circles with the radii of 11 cm and 3 cm with the center at M.
1930.	If the distance between M and N = 17 cm, then the length of the tangent outer common of AB is…																																-
1931.	Result																																-
1932.	total Question = 5																																-
1933.	right answer = 0																																-
1934.	**our** score is = 0																				√									√			**Your** score is...
1935.	Start now…																																-
1936.	Are you ready for evaluation?																																-
1937.	Type your name **than** press enter								√																	√							Type your name **then** press enter.

1938.	If a diameter of a circle is 3,5 m, then the circumference is…																																	-
1939.	Your answer is wrong																																	-
1940.	The area of a circle, with the diameter of 20 cm is…																																	-
1941.	The area of circle = 616 cm^2, then its circumference is…																																	-
1942.	The area of a segment of the circle as seen on the picture is…																																	-
1943.	Study the picture on the right.																																	-
1944. 1945.	If the length of its side is 14 cm, calculate the area of the shaded space																																	-
1946.	Your Answer is right.																																	-
1947.	If the length of a rectangular side is 14 cm, then the circumference of the shaded space as seen on the picture is..																																	-
1946.	Your answer is wrong																																	-
1947.	The radius of a circle inside right triangle **whose the length are 3 cm, 4 cm, and 5 cm, is…**																																	-
1948.	The radius of circle outer right triangle whose the side lengths are 8cm, and 15 cm is…																			√					√									The radius of circle outer right triangle **with the side lengths of 8 cm and 15 cm is…**
1948.	The picture below shows two circle with the centers of P and Q.																																	-
1949.	The radius of PR = 12 cm, QS = 5 cm, and RS is the																																	-

	tangent of outer common.																														
1950.	If PQ = 30 cm, **then** the length of RS is…																√								√						If PQ = 30 cm, the length of RS is…
1951.	Study **to** the following picture					√																				√						Study the following picture.
1952.	If R = 10 cm, and OB = 20 cm, **then** the tangent of AB are …																√								√						If R = 10 cm, and OB = 20 cm, the tangents of AB are …
1953.	Evaluation Result																														
1954.	Total Question = 10																														
1955.	Right Answer = 1,																														
1956.	Your score is 10																														

Table 7. Cube and Cuboids

No	Item	Types of Errors																								Causes of Errors								Alternative Corrections
		Overt errors												Covert errors												Inter	Intra	Cont	Communication Strategies					
		omission			addition			Selection			Ordering			Omission			Addition			Selection			ordering											
		M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S	M	L	S				Av	Pr	Co	Ap	La	
1957.	**Polyhedra**	√																									√							**Polyhedral**
1958.	Cube and **Cuboid**													√													√							Cube and **Cuboids**
1959.	Cube and **Cuboid** net													√													√							Cube-**Cuboids** net
1960.	Cube-**Cuboid** Dimension													√													√							Cube-**Cuboids** Dimension
1961.	Prism																																	-
1962.	Pyramid																																	-
1963.	Evaluation																																	-
1964.	Cube and **Cuboid** sub topics													√													√							Cube and **Cuboids** sub topics
1965.	The element of cube and **cuboid**													√													√							The elements of cube and **cuboids**
1966.	Cube and **cuboid** name													√													√							Cube and **Cuboids** name
1967.	The diagonal of cube and **cuboid**													√													√							The diagonal of cube and **cuboids**
1968.	Select the submenu to learn more																																	-
1969.	Face, edge, and vertex.																																	-
1970.	Vertex																																	-
1971.	Look at the figure of a cube box below																																	-
1972.	In the following figure, there are some edges that meet at one point																																	-
1973.	The intersection of 3 or more edges is called a vertex of the cube or **cuboid**													√													√							The intersection of 3 or more edges is called a vertex of the cube or **cuboids.**
1974.	Edge																																	-
1975.	Look at the building below																																	-

1976.	Look at the intersections between:																															-
1977.	One wall and another																															-
1978.	The wall and the ceiling																															-
1979.	the wall and the floor																															-
1980.	The intersection is a line																															-
1981.	Such a line in a cube or a **cuboid** is called an edge											√												√								Such a line in a cube or a **cuboids** is called an edge.
1982.	Face																															-
1983.	look at the figure of a box below																															-
1984.	The shape of the wood box is a **cuboid**											√												√								The shape of the wood box is a **cuboids.**
1985.	The parts of the wood box are:																															-
1986.	Left and right faces																															-
1987.	Front and back face																															-
1988.	Top and base faces																															-
1989.	Those parts of a cube and **cuboid** are faces											√												√								Those parts of a cube and cuboids are faces.
1990.	Simulation																															-
1991.	show the faces, edges, and vertices of the following wood box																															-
1992.	Top-down side																															-
1993.	left-right side																															-
1994.	front-back side																															-
1995.	Labeling cubes and cuboids																															-
1996.	Each objects has a name, as the following figure																															-
1997.	A cube and **cuboid** also have names											√												√								A cube and **cuboids** also have names.
1998.	A cube and **cuboid** are named after the points of its base face and top face											√												√								A cube and **cuboids** are named after the points of its base face and top face.

1999.	If the cube is named after each point, then the name of the cube is cube ABCDEFGH																																-
2000.	ABCD = base face																																-
2001.	EFGH = top face																																-
2002.	Give a name to the following **cuboid**												√														√						Give a name to the following **cuboids**
2003.	The names of cuboids																																-
2004.	Properties of vertices of a cube and a cuboid												√														√						Properties of vertices of a cube and a cuboids
2005.	Vertices facing each other																																-
2006.	If two vertices of a cube or **cuboid**, **then** a vertex **of** do not become a common vertex in one face, then they are facing each other	√				√			√																		√						If two vertices of a cube or **cuboids, and** a vertex do not become a common vertex in one face, then they are facing each other.
2007.	Examples: B and H, E and C																																-
2008.	Adjacent vertices																																-
2007.	if two vertices are on the same edge, then they are adjacent vertices																																-
2008.	Examples: B and C, A and D																																-
2009.	Find other adjacent vertices																																-
2010.	please try to find other closed vertex.																																-
2011.	Properties of edges of a cube an a **cuboid.**												√														√						Properties of edges of a cube and a **cuboids.**
2012.	1. Edges facing each other																																-
2013.	the edges of a cube and a **cuboid** are **face** each other if both edges have no common point	√																									√						The edges of a cube and a **cuboids** are **facing** each other if both edges have no common point.
2014.	Examples: AB and GH, AD and FG																																-

2015.	Please find other edges facing each other																															-
2016.	2. Intersecting edges																															-
2017.	Examples: AB and BF, BC and CG																															-
2018.	Look at the following intersecting edges																															-
2019.	Please find other intersecting edges																															-
2020.	3. Skew edges																															-
2021.	if two edges of a cube or a **cuboid** are not in one face, **then** they are skew edges.												√				√									√						If two edges of a cube or a **cuboids** are not in one face, they are skew edges.
2022.	Example: AE and BC																															-
2023.	Look at the following skew edges.																															-
2024.	Please find other skew edges																															-
2025.	The types of cubes and **cuboid is** classified into 3: vertical, horizontal, orthogonal	√						√																		√						The types of cubes and **cuboids are** classified into 3: vertical, horizontal, orthogonal.
2026.	1. Parallel																															-
2027.	Two faces of a cube and a **cuboid** are parallel if they do not intersect at one point													√												√						Two faces of a cube and a **cuboids** are parallel if they do not intersect at one point.
2028.	Example: ABFE and CDHG																															-
2029.	please find other parallel faces																															-
2030.	2. Intersecting																															-
2031.	two faces of a cube And a **cuboid** are intersecting if they intersect at one point												√													√						Two faces of a cube And a **cuboids** are intersecting if they intersect at one point.
3032.	Example: ABCD and ABFE																															-
2033.	please try to find other																															-

	intersecting faces.																															
2034.	find out other intersecting faces.																															-
2035.	Diagonals of a cube and a **cuboid**												√													√							Diagonals of a cube and a cuboids
2036.	Look at the cube and **cuboid** below												√													√							Look at the cube and cuboids below.
2037.	the diagonal of a face is obtained by connecting two vertices facing each other.																															-
2038.	Each face of a cube and **cuboid** has two diagonals												√													√							Each face of a cube and **cuboids** has two diagonals.
2039.	A diagonal is a line connecting vertices facing each other on one face																															-
2040.	A diagonal of a cube and a **cuboid**												√													√							A diagonal of a cube and a **cuboids**
2041.	1. A face diagonal																															-
2042.	a face diagonal of a cube or a **cuboid** is a line segment which connects two vertices facing each other on the same face of a cube or the **cuboid**												√													√							a face diagonal of a cube or a **cuboids** is a line segment which connects two vertices facing each other on the same face of a cube or the **cuboid.**
2043.	Example: BG, CH																															-
2044.	Find other face diagonals																															-
2045.	A cube or a cuboid has 12 face diagonals												√													√							A cube or a cuboids has 12 face diagonals.
2046.	Find other face diagonals																															-
2047.	2. A space diagonal																															-
2048.	A space diagonal of a cube or a **cuboid** is a line segment which connects two vertices facing each other on different faces of the cube or the **cuboid**												√													√							A space diagonal of a cube or a **cuboids** is a line segment which connects two vertices facing each other on different faces of the cube or the **cuboids.**

2049.	Examples: AG, CE																																-
2050.	Find other face diagonals																																-
2051.	3. A diagonal plane																																-
2052.	A diagonal plane of a cube or a **cuboid** is a plane inside a cube or a **cuboid** made of two parallel edges that are not in the same face												√												√								A diagonal plane of a cube or a *cuboids* is a plane inside a cube or a **cuboids** made of two parallel edges that are not in the same face
2053.	Examples: ABGH																																-
2054.	Find other diagonal planes																																-
2055.	A cube or a **cuboid** has 6 diagonal planes												√												√								A cube or a **cuboids** has 6 diagonal planes.
2056.	Find other diagonal planes																																-
2057.	Quiz																																-
2058.	Look at the dice and the tea box below																																-
2058.	Identify the parts of the dice and the tea box																																-
2059.	If the dice is a cube, and the tea box is a **cuboid**, complete the table below.												√												√								If the dice is a cube, and the tea box is a **cuboids,** complete the table below.
2060.	Objects: dice, tea box																																-
2061.	Number of faces																																-
2062.	Number of edges																																-
2063.	Number of vertices																																-
2064.	Cube and cuboid net												√												√								Cube and cuboids net
2065.	Subtopics: **understand** the cube and **cuboid** nets	√																							√								Subtopics: **understanding** the cube and **cuboids** nets
2066.	More example of cube and **cuboid** nets												√												√								More example of cube and **cuboids** nets.
2067.	Select the menu to learn more																																-
2068.	What is a net?																																-
2069.	Look at the picture on the left																																-

2070.	Its shape is a cube																																-
2071.	If the wrapping is opened, what can you see?																																-
2072.	If it is opened, it shows its net.																																-
2073.	Thus, a net is a set of figures that form a plane, when they are spread.																																-
2074.	The cube net																																-
2075.	Cut a cube along some of its edges, for instance, along PT, SW, -VR, QU, TU, VW, and P-S, and spread them																																-
2076.	They form the cuboid nets																																-
2077.	Other example of the **cuboid** nets											√													√							Other examples of the **cuboids** nets.
2078.	Quiz																																-
2079.	Are you ready for quiz?																																-
2080.	Type your name then press the enter																																-
2081.	1. From the picture, which one is the edges of a cube?																																-
2082.	2. On the picture is cube ABCD EFGH and one of it's edge, so the point E is on position number…																																-
2083.	3. From the picture of cube edges below, square number G is the base, which square is the top of a cube…																																-
2084.	4. From four sets of squares below which one is set of cube edges																																-
2085.	(1) **dan** (2)							√																								√	(1) **and** (2)
2086.	(1) **dan** (3)							√																								√	(1) **and** (3)

2087.	(1) **dan** (4)							√																						√	(1) **and** (4)
2088.	(2) **dan** (3)							√																						√	(2) **and** (3)
2089.	5. The set of squares on the picture is edges of a cube.																																-
2090.	The marked square is the base																																-
2091.	Which one is the top																																-
2092.	Total Questions = 5																																-
2093.	Right Answers = 3																																-
2094.	Your score is = 60																																-
2095.	Cube-**Cuboid** Dimension											√												√									Cube-**Cuboids** Dimension
2096.	Subtopics: 1. Surface area of cube and **cuboid**											√												√									Subtopics: 1. Surface area of cube and **cuboids**
2097.	2. The volume of cube and **cuboid**											√												√									2. The volume of cube and **cuboids**
2098.	Select the menu to learn more																																
2099.	Surface area of a cube and **cuboid**											√												√									Surface area of a cube and **cuboids**
2100.	Problem:																																
2102.	A factory will wrap its product in the form of a **cuboid**											√												√									A factory will wrap its product in the form of a **cuboids.**
2103.	Its length, width, and height are 20cm, 14cm, and 7cm respectively																																-
2104.	Everyday, the factory produces 100.000 boxes of snacks that are ready for sale.																																-
2105.	Find out the minimum surface area of paper needed to wrap the snacks everyday																																-
2106.	Solution																																-

2107.	To solve the problem, we have to find the surface area of the box																																-
2108.	To find the area of each face, we need to draw nets of the cuboid box												√													√							To find the area of each face, we need to draw nets of the cuboids box.
2109.	Find the area of each face of the box, and add all of the areas.																																-
2110.	If the length of the box is p unit, the **widht** is l unit, and the height is t unit, then the surface area of the **cuboid** box can be calculated as follows											√											√			√			√				If the length of the box is p unit, the **width** is l unit, and the height is t unit, then the surface area of the **cuboids** box can be calculated as follows:
2111.	left face																																-
2112.	top face																																-
2113.	front face																																-
2114.	bottom face																																-
2115.	back face																																-
2116.	right face																																-
2117.	Area of front face																																-
2118.	Area of back face																																-
2119.	Area of right face																																-
2120.	Area of left face																																-
2121.	Area of top face																																-
2122.	Area of base face																																-
2123.	Suppose the surface area of the **cuboid** is express by L, then												√													√							Suppose the surface area of the **cuboids** is express by L, then
2124.	The surface area of the cube if the edges lengths are the same can be formulated as follows																																-
2125.	Then, the surface area of																																-

	the box is																																	
2126.	Thus, the minimum surface area of paper needed to wrap the snacks everyday is 1.036 x 100.000 = 103. 600. 000 cm^2 or 10. 360m^2																																-
2127.	Example: The area of a cube base is 20cm. So, the square area of the cube is…																																-
2128.	Solution: the square area of the cube = … cm^2																																-
2129.	The area of the cube base = 20cm																																-
2130.	Cube: the area of the cube base = 20cm. So, the length of its side = the face area of the cube = 6x the base area																																-
2131.	Volume of a cube and **cuboid**												√													√							Volume of a cube and **cuboids**
2132.	A volume of figure A is the sum of small cubes in figure A.																																-
2133.	A volume is measured in cubic unit.																																-
2134.	Figure A consists of 12 small cubes (cubic units)																																-
2135.	Suppose a small cube has a volume of 1cm^3																																-
2136.	Figure A has a volume of 12 small cubes or 12 x 1 = 12cm^3																																-
2137.	To determine the volume of a cube, first we find the area the base face, and then multiply it by the height of the cube																																-

2138.	Then, the formula of the cube is:																																-
2139.	To determine a volume of a **cuboid,** we must find its width and its length												√														√						To determine a volume of a **cuboids**, we must find its width and its length.
2140.	If length = p, the width = l, and the height = t, then the volume of a cuboid can be calculated using the following formula												√														√						If length = p, the width = l, and the height = t, then the volume of a **cuboids** can be calculated using the following formula.
2141.	Example																																-
2142.	Determine the volume of a cube that has the face area 1.176 cm^2																																-
2143.	Solution: The cube volume = … cm^3																																-
2144.	The cube has 6 faces. Therefore, the area of a cube face = 1.176 : 6 = 196 cm^2																																-
2145.	The length of a cube = 14cm, so the cube volume = 2744 cm^3																																-
2146.	Example 2 : Determine the volume of a box that can be made from the net on the right.																																-
2147.	Solution: the box volume = … cm^3																																-
2148.	Quiz																																-
2149.	Are you ready for quiz?																																-
2150.	Type your name **than** press enter							√																			√						Type your name **then** press enter.
2151.	1. If the one of the diagonals of a cube face is 50 cm, the area of the cube face is…																																-

2152.	2. *Given* the cube volume 216 cm^3	√				√																			√							the cube's volume is 216 $cm^{3.}$
2153.	3. The net area of the **cuboid whose size is 15cm x 10 cm x 6 cm is…**								√																√							3. The net area of the **cuboids, which has size of 15cm x 10 cm x 6 cm, is…**
2154.	The total number of the length of the cube edges is…																															-
2155.	4. **Given** the length of a **cuboid** is 12 cm, the width is 4cm, and the height is 6cm	√				√																		√	√							The length of a **cuboids** is 12 cm, the width is 4cm, and the height is 6cm.
2156.	The area of the **cuboid** face is…	√																							√							The area of the **cuboids'** face is…
2157.	Total Questions = 5																															-
2158.	Right Answers = 0																															-
2159.	Your score is = 0																															-
2160.	Prism																															-
2161.	Sub topics: 1. Definition of prism																															-
2162.	2. The diagonal prism																															-
2163.	3. The net of prism																															-
2164.	4. The dimension of prism																															-
2165.	Select the sub menu to learn more																															-
2166.	Definition of a prism																															-
2167.	Look at the top part of the picture																															-
2168.	In mathematics, such a figure is called a triangular prism																															-
2169.	The prism shown in the picture is constructed of two congruent and parallel triangular faces and three rectangular faces.																															-
2170.	A prism is a closed three																															-

	dimensional figure constructed of two parallel and congruent polygonal face, and its other faces are rectangles.																																
2171.	a face diagonal of a prism																																-
2172.	A face diagonal of a prism is a line segment connecting two vertices located on different edges and on one face																																-
2173.	Examples AE, BD																																-
2174.	Look at the following examples of face diagonals of a prism: CE, BF																																-
2175.	Are there other face diagonals of a prism?																																-
2176.	Find them out																																-
2177.	Net of a prism																																-
2178.	The net of a prism is a plane, made of a set of faces that form a prism.																																-
2179.	Area and volume of a prism																																-
2180.	Area of a prism																																-
2181.	Look at the figure of a prism net on the left																																-
2182.	The shape of the net is a right triangular prism																																-
2183.	The area of a prism is the total of the face areas of the prism																																-
2184.	Area of a prism ABCD.DEF = area of a triangle ABC + area of ADFC + area of ABED + area of BCFE + area of triangle DEF																																-

| | | |

2199.	Length of edge = 8cm																															-
2200.	Height of a prism = 15cm																															-
2201.	Calculate the volume of a prism?																															-
2202.	First, found out the height of the base triangle, say h																															-
2203.	Area of prism base = area of equilateral **tria**	√																											√			Area of prism base = area of equilateral **triangle.**
2204.	Volume of a prism = area of base x height																															-
2205.	Quiz																															-
2206.	Are you ready for quiz?																															-
2207.	Type your name **than** press enter							√																	√							Type your name **then** press enter.
2208.	1. A prism has base in triangle form																															-
2209.	It's lateral are 3 cm, 4 cm, and 5 cm																															-
2210.	if the height of prism is 12 cm, there are is…																															-
2211.	2. **How much** is the volume of a prism which has base in right feet triangle form.							√																	√							2. **what is** the volume of a prism which has base in right feet triangle form ?
2212.	The right feet lateral are 13 cm, and the other lateral is 10 cm																															-
2213.	If the height of a prism is 15 cm.																															-
2214.	The area of a prism is…																															-
2215.	4. A prism has base in right angled triangle form.																															-
2216.	It's lateral are 9 cm, 12 cm, and 15 cm																															-
2217.	If the height of prism is 20 cm, the volume of prism is…																															-

2218.	Quiz Result																																-
2219.	Total Questions = 4																																-
2220.	Right Answers = 0																																-
2221.	Your score is = 0																																-
2222.	Pyramid																																-
2223.	Sub topics: 1. Definition of a pyramid																																-
2224.	2. The diagonal pyramid																																-
2225.	3. The net of pyramid																																-
2226.	4. The dimension of pyramid																																-
2227.	Select the sub menu to learn more																																-
2228.	Look at the picture on the left																																-
2229.	The shape of the tent is a pyramid																																-
2230.	In the picture, there are 1. The base face which is quadrilateral																																-
2231.	2. Slant faces which are equilateral triangles																																-
2232.	A pyramid is a three dimensional figure constructed of a polygon as the base face and triangles as the slant faces																																-
2233.	Diagonal of a pyramid																																
2234.	1. A face diagonal																																-
2235.	A face diagonal of a prism is a line connecting two vertices facing each other on the prism base.																																-
2236.	Examples : AC, BD																																-
2237.	2. A plane diagonal																																-
2238.	A plane diagonal of a																																-

	pyramid is a plane passing through base diagonal and top point of the pyramid																																	-
2239.	Examples: TAB, TCD																																	-
2240.	In other pyramid shapes, a number of plane diagonals can be found using formula as follows																																	-
2241.	number of plane diagonal of a pyramid of angle n is																																	-
2242.	A net of pyramid																																	-
2243.	Look at the figure (a)																																	-
2244.	Picture (a) is a quadrilateral pyramid																																	-
2245.	If its faces are spread, they will form a plane as shown by picture (b)																																	-
2246.	The set of pyramid faces is called a net-																																	-
2247.	A pyramid net is a plane, made of a set of faces that form a pyramid																																	-
2248.	Area of a pyramid																																	-
2249.	Look at figure (a)																																	-
2250.	There is a figure of pyramid T.ABCD																																	-
2251.	Figure (b) shows the net of the pyramid																																	-
2252.	The area of a pyramid is the sum of face areas of the net																																	-
2253. 2254.	Area of a pyramid = (area of 4 isosceles triangles) + area of 1 square or area of pyramid = 4 x area stand plane + 1 area quadrilateral																																	-

2255.	Problem																														-
2256.	Calculate the area of a square **whose length of the base edge is 5 cm, and the height of the slant edge is 6 cm?**								√																√						Calculate the area of a square **which has length of the base edge of 5 cm, and the height of the slant edge is 6 cm.**
2257.	Solution: Area of pyramid = … cm^2																														-
2258.	**Given** length of base edge (a) = 5 cm height of slant edge (c) = 6				√																				√						length of base edge (a) = 5 cm height of slant edge (c) = 6.
2259.	Area of a pyramid?		√																						√						**What is the** area of a pyramid?
2260.	Answer: Area of a pyramid = 85 cm^2																														-
2261.	Volume of a pyramid																														-
2262.	Figure (a) shows a cube																														-
2263.	Its edge length is 2t.																														-
2264.	All of the face diagonals are intersect at point P.																														-
2265.	In a cube, there are six quadrilateral and congruent pyramids																														-
2266.	One of the pyramids is the pyramid P.ABCD as shown in at figure (b)																														-
2267.	The height of PQ is half of the length of the cube edge, t.																														-
2268.	The total of volume of six pyramids is the same as the volume of a cube																														-
2269.	Volume of cube ABCD.EFGH = 6 x volume of pyramid P.ABCD																														-
2270.	Volume of pyramid P.ABCD																														-

	= $\frac{1}{3}$ x area of base x height																															
2271.	Problem																															-
2272.	Have you ever heard one of the seven wonders in the world called a pyramid?		√																							√						Have you ever heard **of** one of the seven wonders in the world called a pyramid?
2273.	Pyramid can be found in Egypt.																															-
2274.	They are places **to keep corpses of Kings of Egypt (Pharaohs) preserved** by embalming them.					√				√																√				√			They are places **to preserve corpses of Kings of Egypt (Pharaohs)** by embalming them.
2274.	They are called mummies																															-
2275.	The shapes of the places are pyramids																															-
2276.	The area of the base is approximately 300. 000 square feet and the height is 321 feet.																															-
2277.	What is the volume of the pyramid?																															-
2278.	Solution: volume pyramid = … $feet^3$																															-
2279.	Given: the area of base A (a) = 3000 kaki					√																				√						The area of base A (a) = 3000 feet.
2280.	The height (h) = 321 **kaki**								√																						√	The height (h) = 321 **feet**
2281.	What is the volume of the pyramid?																															-
2282.	Answer: volume of the pyramid = 32. 100. 000 $feet^3$																															-
2283.	Pyramid Quiz																															-
2284.	Are you ready for quiz?																															-
2285.	Type your name **than** press enter								√																	√						Type your name **then** press enter.
2286.	1. A pyramidal has a base of right feet triangle.				√																					√						1. A pyramid has a base of right feet triangle.

2287.	**Its's** right feet triangle.				√																					√							**Its** right feet is triangle.
2288.	The other lateral is 12 cm, the height of prism is 15 cm, the volume of prism is…																															-
2289.	2. A pyramidal has a base of rhomb, **it's** laterals are 13 cm, one of **it's** diagonals is 10 cm, height of pyramidal is 15 cm the volume of **pyramidal** is…				√					√																√							2. A pyramid has a base of rhomb, **its** laterals are 13 cm, one of **its** diagonals is 10 cm, height of pyramid is 15 cm the volume of **the** pyramid is…
2290.	3. **How much** is the surface area of a pyramidal, which has base lateral of 10 cm and height of 12 cm…				√				√																	√							3. **what** is the surface area of a pyramid, which has base lateral of 10 cm and height of 12 cm…
2291.	4. **How much** is the surface area of a rectangle **pyramidal.** Which has base edge of 5 cm and **apotem** of 6 cm…	√			√				√																	√							4. **What** is the surface area of a rectangle **pyramid**, which has base edge of 5 cm and **apothem** of 6 cm…
2292.	5. Pyramidal T.ABCD AB = BC= CD= AD= 14 cm				√																					√							5. Pyramid T.ABCD AB = BC= CD= AD= 14 cm.
2293.	TA = TB = TC = TD = 25 cm																															-
2294.	the area of it's vertical face is…																															-
2295.	Quiz Result																															-
2296.	Total Questions = 5																															-
2297.	Right Answers = 0																															-
2298.	Your score is = 0																															-
2299.	**Polyhedra** Evaluation												√													√							**Polyhedral** Evaluation
2300.	Are you ready for evaluation?																															-
2301.	Type your name **than** press enter								√																	√							Type your name **then** press enter.
2302.	1. If one of face diagonal of a cube is 50 cm, the area of cube face is…																															-

2303.	2. The picture below shows edges of a cube.																															-
2304.	If square number 3 is the top (cover) of cube, which one is the base…																															-
2305.	3. The **sketh** below shows a scout tent in a prism form.													√											√							3. The **sketch** below shows a scout tent in a prism form.
2306.	the area of **it's** base is $10m^2$ width 2 m and **heigth** 3 m							√		√															√							The area of **its** base is $10m^2$ width 2 m and **height** 3 m.
2307.	**How much** is the volume of the tent…										√														√							**What** is the volume of the tent…
2308.	4. A **pyramidal** has a base of parallelogram				√																				√							4. A **pyramid** has a base of parallelogram.
2309.	**It's** base and **heigth** are 12 cm and 10 cm							√		√															√							**Its** base and **height** are 12 cm and 10 cm.
2310.	if the volume is 600 cm^3, the **heigth** of **pyramidal** is..				√						√														√							if the volume is 600 cm^3, the **height** of **pyramid** is..
2311.	5. Base perimeter of a cube is 20 cm																															-
2312.	the area of cube is …																															-
2313.	6. A workman **construct** a cubical tub.	√																							√							6. A workman **constructs** a cubical tub.
2314.	It's top and front face are 50 m^2 dan 30 m^2							√																	√						√	**Its** top and front face are 50 m^2 **and** 30 m^2
2315.	If the front edge is 10 m, the volume of tub is…																															-
2316.	7. ABCD. EFGH is a cube.																															-
2317.	**It's** edges is 6 cm.							√																	√							**Its** edges is 6 cm.
2318.	**volum** of **pyramidal** T.ABCD is…	√			√																				√				√			**volume** of **pyramid** T.ABCD is…
2319.	8. How many space diagonal does a eight sided prism…		√																						√							8. How many space diagonal does a eight sided prism **have…**
2320.	9. A prism has a base of right angled triangle.																															-
2321.	**It's** lateral are 6 cm, 8 cm,							√																	√							**Its** lateral are 6 cm, 8 cm, and 10

	and 10 cm																														cm
2322.	If **it's heigth** is 15 cm, the volume is…							√		√															√						If **its height** is 15 cm, the volume is…
2323.	10. How many faces, edges, vertex does a cube have…																														-
2324.	11. How many edges does a five sided prism have…																														-
2325.	12. Volume of prism, which has a base of right feet triangle is…																														-
2326.	13. A **pyramidal** has a base of right feet triangle				√																				√						13. A **pyramid** has a base of right feet triangle
2327.	The right feet lateral are 10 cm																														-
2327.	The other lateral is 12 cm, and the **heigth** is 15 cm																					√			√						The other lateral is 12 cm, and the **height** is 15 cm
2328.	The volume of **pyramidal** is…				√																				√						The volume of **pyramid** is…
2329.	14. Among these sets of squares, which one is the edges of a cube…																														-
2330.	15. How many faces does a six sided prism have?																														-
2331.	Evaluation Result																														-
2332.	Total Question = 15																														-
2333.	Right Question = 7																														-
2334.	Your score is = 46, 66666666																														-