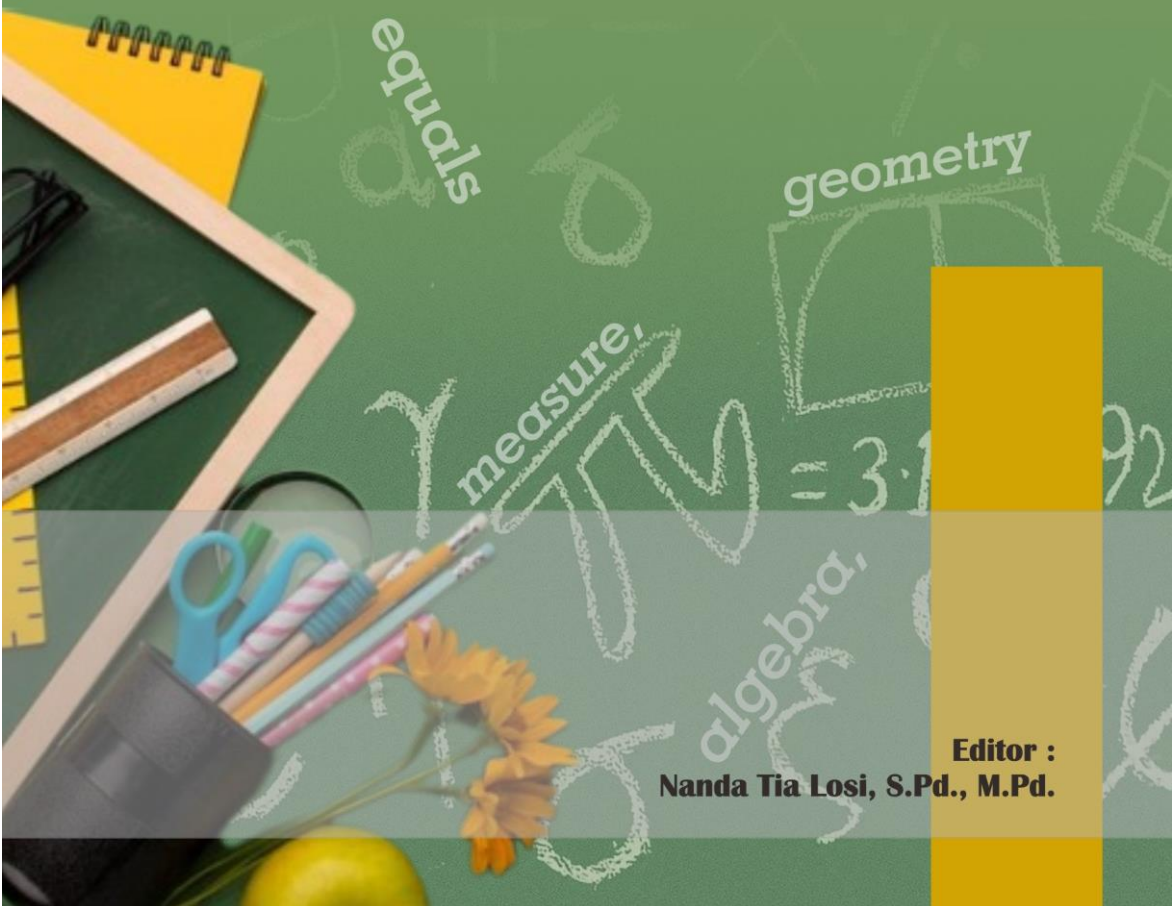


Rizky Vita Losi, S.Pd.I., M.Hum.



# English for Mathematics



**Editor :**  
**Nanda Tia Losi, S.Pd., M.Pd.**

# ENGLISH FOR MATHEMATICS

Rizky Vita Losi, S.Pd.I., M.Hum.



**Tahta Media Group**

## UU No 28 tahun 2014 tentang Hak Cipta

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Hak Cipta sebagaimana dimaksud dalam Pasal 3 huruf a merupakan hak eksklusif yang terdiri atas hak moral dan hak ekonomi.

### **Pembatasan Pelindungan Pasal 26**

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# ENGLISH FOR MATHEMATICS

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## **FOREWORD**

Most of Mathematics students who learn English as a foreign language for their subject at class feel confuse to integrate Mathematics and English for the learning process. They find it difficult how to apply Mathematics things in English. Apart of that, they find difficult to learn how to speak, listen, read, and write any text or record in English. It effects on their ability to communicate in English and learn Mathematics in English as well.

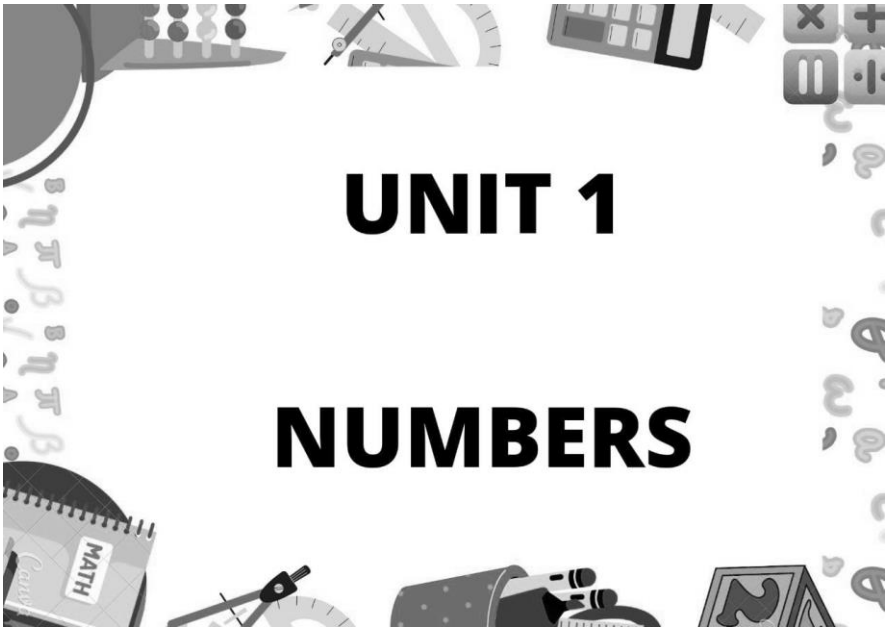
This book is prepared to help students establish good-communication in English as well as high order thinking skills in Math. It contains lessons in Math terms and also English terms contains text, idioms, conversation, and grammatical study. Many of the ideas for writing this book have been adapted from English theory and practice book, and websites related to English topics and exercises.

Finally, I hope that this book can be useful for the students to add their knowledge on the basic understanding of English in Mathematics study.

**Rizky Vita Losi**

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### **Learning Objectives**

After studying this unit, you will be able to:

1. Classify cardinal and ordinal number

## NUMBERS

A number is an arithmetical value, expressed by a word, symbol, or figure, representing a particular quantity and used in counting and making calculations and for showing order in a series or for identification. Hence, a number is a mathematical concept used to count, measure, and label. Thus, numbers form the basis of mathematics.

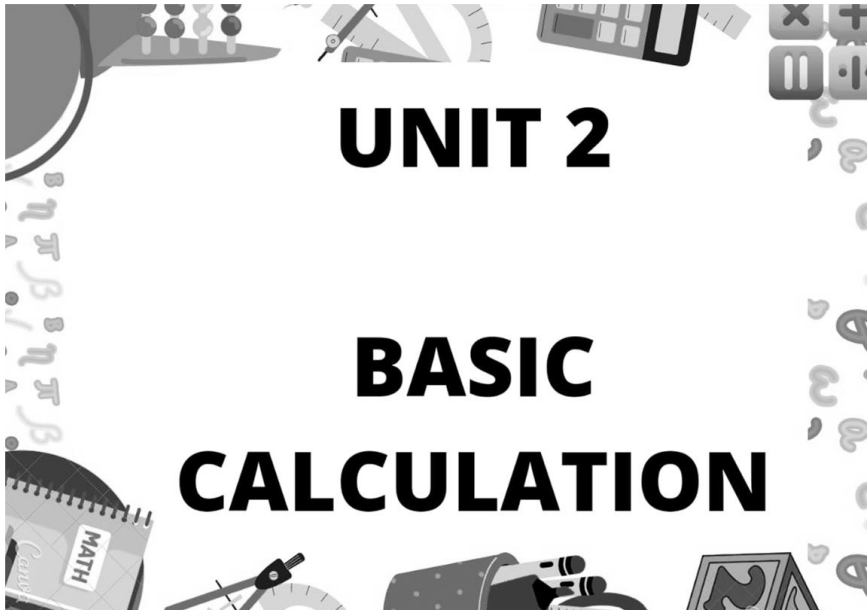
### A. HISTORY OF NUMBERS

The inscriptions found at archaeological sites show that early humans used various symbols to show numbers. For example, ancient farmers, traders, and merchants used tally marks to show quantities. In tally marks, a standing line is drawn for each count and the fifth count is shown by striking off the four lines. This, however, was a tedious way and it was not feasible to show quantities.

Different ways of writing numbers were brought to use with the development of early civilizations. They used different symbols to show larger quantities. But even with these systems, it was not easy to show large quantities.

Around the seventh century, a decimal (or base ten) positional method, was perfected in India. This method used ten unique symbols to represent any number or quantity. These symbols are 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9.

This system was spread across Europe by the Arab merchants, scholars, and conquerors. This system is called the Hindu–Arabic numeral system, and it remains the most common system for representing numbers to date.



### **Learning Objectives**

After studying this unit, you will be able to:

1. Identify basic calculation
2. Classify countable and uncountable nouns correctly

## BASIC CALCULATION

There are four operations that can be performed when working with whole numbers. These four operations are **addition, subtraction, multiplication, and division**. We use the operations in everyday life for a multitude of tasks.

### A. ADDITION

The most basic of these four operations is **addition**. Addition is the operation that involves calculating the total amount of a represented group. To add a set of numbers together, we first need to line them up vertically by place value. Then, add each column of numbers from right to left. If a column has a sum greater than 9, we will carry the tens place to the next column.

Let's take a visit to the local mall to visit my good friends Val and Keri. They own a local cookie shop where they are busy getting ready for their customers.

Val and Keri have several orders placed for today and need to know how many cookies they should bake. They have orders of 116 chocolate chip cookies, 524 sugar cookies, and 75 snicker doodle cookies. Val asks Keri to calculate how many cookies they must bake today.

Keri knows that to start adding these numbers together, she must line them up vertically by place value. So, Keri writes down 524, 116, and 75 lined up on the order form.

Keri begins by adding the column on the right.  $4 + 6 + 5$  equals 15. She knows that since her value is greater than 9, she must carry the tens place to the next column. So, she writes down the 5 and carries the 1 to the next column.

To add the next column, Keri will need to add  $7 + 1 + 2$  + the 1 that we carried. The sum of these numbers is 11. Again, Keri must carry the tens value since the total is greater than 9.

Next, she needs to add the last column  $5 + 1$  + the carried 1 equals 7. Keri now knows that they need to bake 715 cookies to fill all of their customer orders.



## WORD PROBLEMS IN MATH

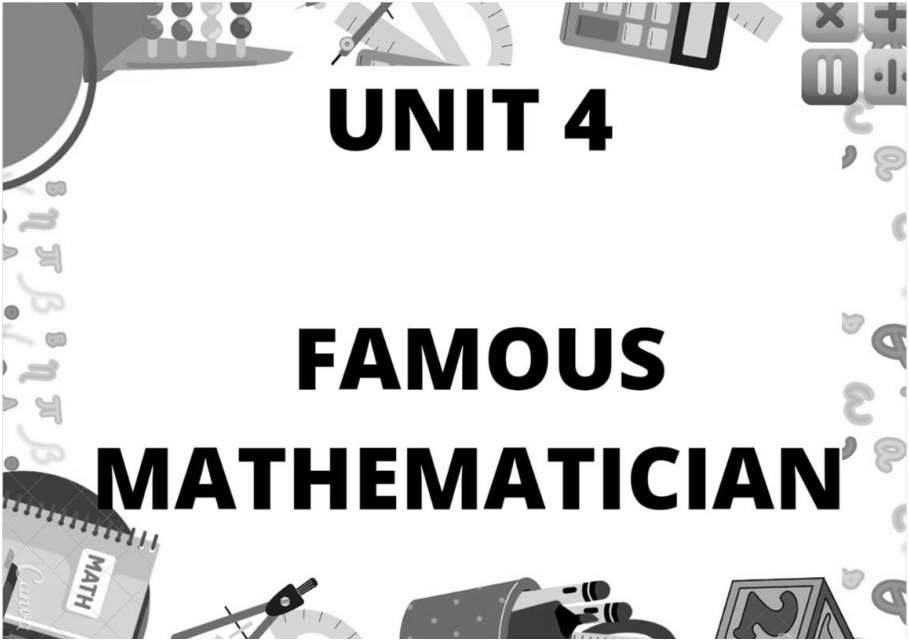
A word problem in math is a math question written as one sentence or more that requires children to apply their math knowledge to a ‘real-life’ scenario.

This means that we must be familiar with the vocabulary associated with the mathematical symbols they are used to, in order to make sense of the word problem. For example:

If you see this word/phrase...	...you must do this
Add a surplus, more, total, and, together, sum, increase by...	add
difference between, reduce, fewer, minus, decrease...	subtract
share, equal groups, split...	divide
product, groups of, lots of...	multiply

### How to Solve Word Problems

1. **Question:** Understand what the question is asking. What operation or operations do you need to use to solve this question? Ask for help to understand the question if you can't do it on your own.
2. **Estimate:** Use an estimation strategy, so you can check your answer for reasonableness in the evaluate step. Try underestimating and overestimating, so you know what range the answer is supposed to be in. Be flexible in rounding numbers if it will make your estimate easier.
3. **Strategize:** Choose a strategy to solve the problem. Will you use mental math, manipulatives, or pencil and paper? Use a strategy that works for you. Save the calculator until the evaluate stage.
4. **Calculate:** Use your strategy to solve the problem.
5. **Evaluate:** Compare your answer to your estimate. If you under and overestimated, is the answer in the correct range. If you rounded up or



### **Learning Objectives**

After studying this unit, you will be able to:

1. Know the famous western and Islamic mathematicians
2. Classify adjectives correctly

## FAMOUS MATHEMATICIAN

### **A. EUROPEAN MATHEMATICIANS**

#### **1. Pythagoras**

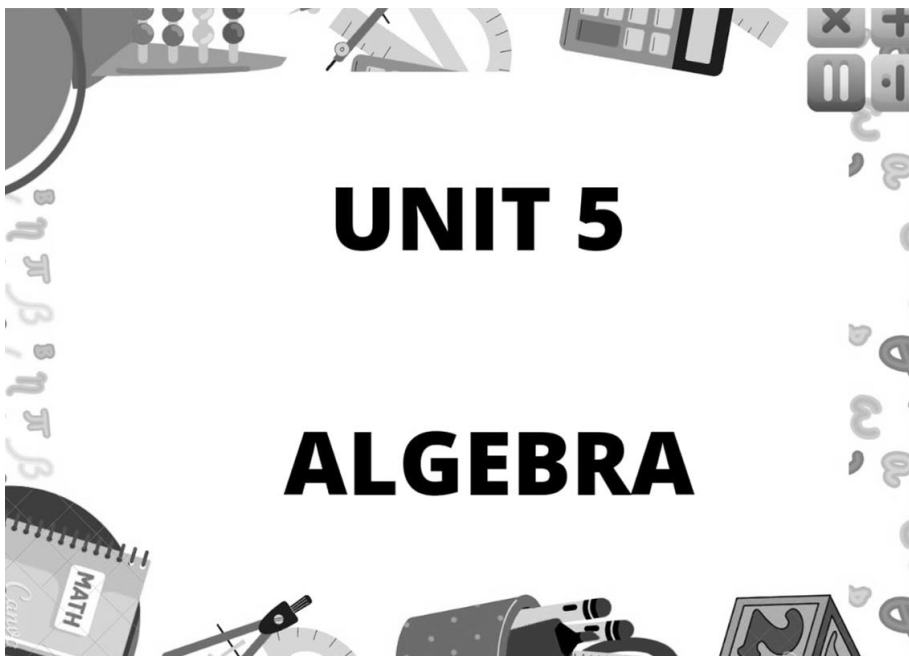
Vegetarian mystical leader and number-obsessive, he owes his standing as the most famous name in maths due to a theorem about right-angled triangles, although it now appears it probably predated him. He lived in a community where numbers were venerated as much for their spiritual qualities as for their mathematical ones. His elevation of numbers as the essence of the world made him the towering primogenitor of Greek mathematics, essentially the beginning of mathematics as we know it now. And, famously, he didn't eat beans.

#### **2. Girolamo Cardano**

Italian polymath for whom the term Renaissance man could have been invented. A doctor by profession, he was the author of 131 books. He was also a compulsive gambler. It was this last habit that led him to the first scientific analysis of probability. He realised he could win more on the dicing table if he expressed the likelihood of chance events using numbers. This was a revolutionary idea, and it led to probability theory, which in turn led to the birth of statistics, marketing, the insurance industry and the weather forecast.

#### **3. Carl Friedrich Gauss**

Known as the prince of mathematicians, Gauss made significant contributions to most fields of 19th century mathematics. An obsessive perfectionist, he didn't publish much of his work, preferring to rework and improve theorems first. His revolutionary discovery of non-Euclidean space (that it is mathematically consistent that parallel lines may diverge) was found in his notes after his death. During his analysis of astronomical data, he realised that measurement error produced a bell curve – and that shape is now known as a Gaussian distribution.



# UNIT 5

# ALGEBRA

## **Learning Objectives**

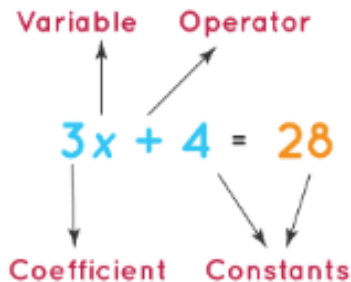
After studying this unit, you will be able to:

1. Solve algebra's problems
2. Classify verbs correctly

## ALGEBRA

Algebra is a branch of mathematics that deals with symbols and the arithmetic operations across these symbols. These symbols do not have any fixed values and are called variables. In our real-life problems, we often see certain values that keep on changing. But there is a constant need to represent these changing values. Here in algebra, these values are often represented with symbols such as  $x$ ,  $y$ ,  $z$ ,  $p$ , or  $q$ , and these symbols are called variables. Further, these symbols are manipulated through various arithmetic operations of addition, subtraction, multiplication, and division, with an objective to find the values.

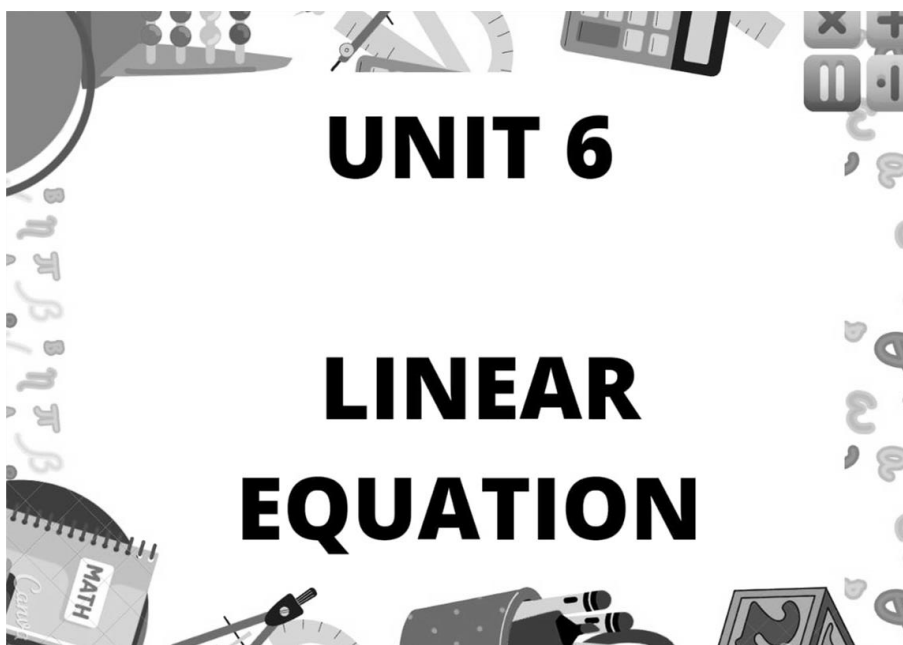
### Algebraic Equation



The above algebraic expressions are made up of variables, operators, and constants. Here the numbers 4 and 28 are constants,  $x$  is the variable, and the arithmetic operation of addition is performed.

### Algebraic Formulas

An algebraic identity is an equation that is always true regardless of the values assigned to the variables. Identity means that the left-hand side of the equation is identical to the right-hand side, for all values of the variables. These formulae involve squares and cubes of algebraic expressions and help in solving the algebraic expressions in a few quick steps. The frequently used algebraic formulas are listed below.



### **Learning Objectives**

After studying this unit, you will be able to:

1. Solve linear equations' problems
2. Classify adverbs correctly

## **LINEAR EQUATIONS**

An equation that has the highest degree of 1 is known as a linear equation. This means that no variable in a linear equation has an exponent more than 1. The graph of a linear equation always forms a straight line.

**Linear Equation Definition:** A linear equation is an algebraic equation where each term has an exponent of 1 and when this equation is graphed, it always results in a straight line. This is the reason why it is named as a 'linear equation'.

There are linear equations in one variable and linear equations in two variables. Let us learn how to identify linear equations and non-linear equations with the help of the following examples.

### **Linear Equation Formula**

The linear equation formula is the way of expressing a linear equation. This can be done in different ways. For example, a linear equation can be expressed in the standard form, the slope-intercept form, or the point-slope form. Now, if we take the standard form of a linear equation, let us learn the way in which it is expressed. We can see that it varies from case to case based on the number of variables and it should be remembered that the highest (and the only) degree of all variables in the equation should be 1.

### **Linear Equations in Standard Form**

The standard form or the general form of linear equations in one variable is written as,  $Ax + B = 0$ ; where A and B are real numbers, and x is the single variable. The standard form of linear equations in two variables is expressed as,  $Ax + By = C$ ; where A, B and C are any real numbers, and x and y are the variables.



### **Learning Objectives**

After studying this unit, you will be able to:

1. Classify set in daily live
2. Classify prepositions correctly

## SET

What is a set? Well, simply put, it's a **collection**. First, we specify a common property among "things" (we define this word later) and then we gather up all the "things" that have this common property. For example, the items you wear: hat, shirt, jacket, pants, and so on. I'm sure you could come up with at least a hundred. This is known as a **set**.

Or another example is **types of fingers**.

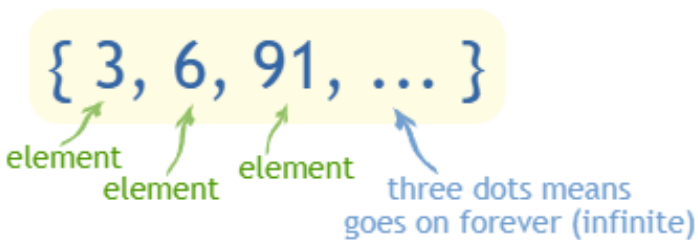
This set includes index, middle, ring, and pinky.



So, it is just things grouped together with a certain property in common.

### Notation

There is a fairly simple notation for sets. We simply list each element (or "member") separated by a comma, and then put some curly brackets around the whole thing:



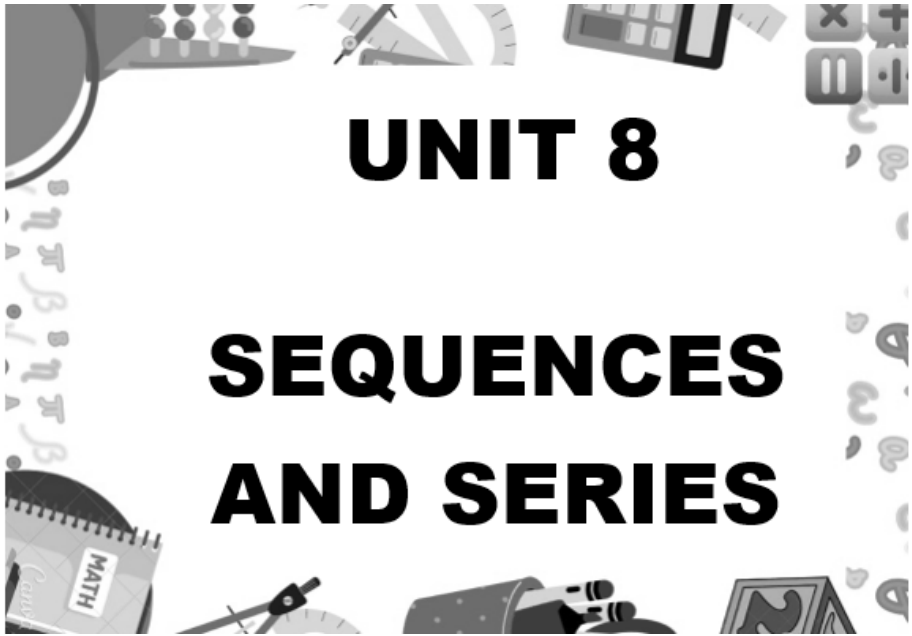
("element" or "member" mean the same thing)

The curly brackets { } are sometimes called "set brackets" or "braces".

This is the notation for the two previous examples:

**{socks, shoes, watches, shirts, ...}**

**{index, middle, ring, pinky}**



# UNIT 8

# SEQUENCES AND SERIES

## Learning Objectives

After studying this unit, you will be able to:

1. Know sequences and series
2. Classify conjunctions correctly

## **SEQUENCES AND SERIES**

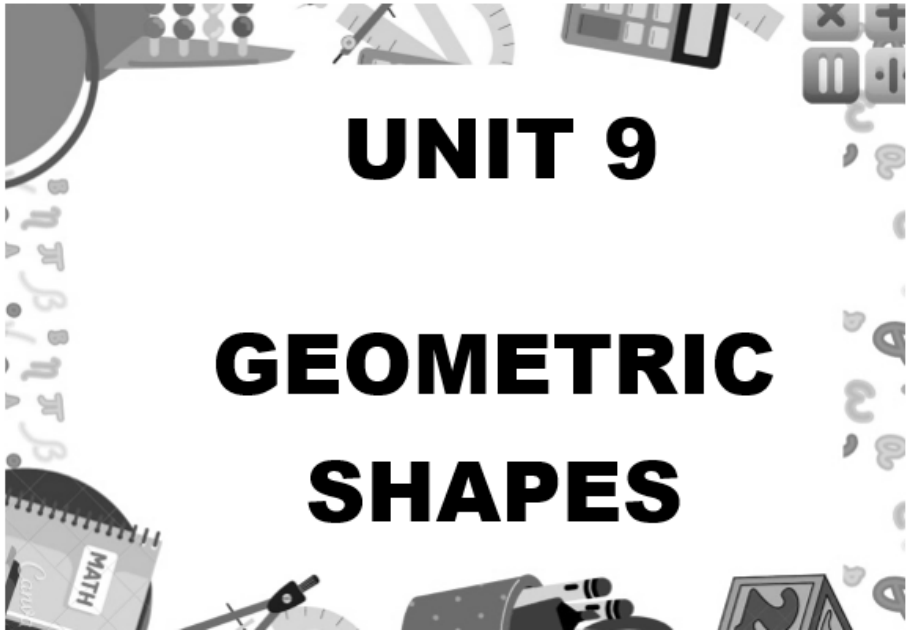
**Sequence and series** are used in mathematics as well as in our daily lives. A sequence is also known as progression and a series is developed by sequence. Sequence and series is one of the basic concepts in Arithmetic. Sequences are the grouped arrangement of numbers orderly and according to some specific rules, whereas a series is the sum of the elements in the sequence. For example, 2, 4, 6, 8 is a sequence with four elements and the corresponding series will be  $2 + 4 + 6 + 8$ , where the sum of the series or value of the series will be 20.

There are various types of sequences and series depending upon the set of rules that are used to form the sequence and series. Sequence and series are explained in detail below.

### **What Are Sequence and Series?**

The sequence is the group or sequential arrangement of numbers in a particular order or set of rules. Series is formed by adding the terms of a sequence. In a sequence, an individual term can be present in many places. Sequences can be of two types, i.e. infinite sequence and finite sequence and series will be then defined by adding the terms of the sequence. Sum of infinite terms in a series is possible in some cases as well.

Let us understand this with an example. 1, 3, 5, 7, 9, 11, ... is a sequence where there is a common difference of 2 between any two terms and the sequence goes on increasing up to infinity unless the upper limit is given. These types of sequences are known as arithmetic sequences. Now if we add the numbers in the sequence like  $1 + 3 + 5 + 7 + 9...$  this will make a series of this sequence. These kinds of series are known as arithmetic series. A few examples of sequence and series are given in the image shown below:



# UNIT 9

# GEOMETRIC SHAPES

## Learning Objectives

After studying this unit, you will be able to:

1. Know kinds of geometric shapes
2. Write a descriptive paragraph

## GEOMETRIC SHAPES

**In Mathematics, geometric shapes** are the figures which demonstrate the shape of the objects we see in our everyday life. In geometry, shapes are the forms of objects which have boundary lines, angles and surfaces. There are different types of 2d shapes and 3d shapes.

Shapes are also classified with respect to their regularity or uniformity. A **regular shape** is usually symmetrical such as a square, circle, etc. **Irregular shapes** are asymmetrical. They are also called freeform shapes or **organic shapes**. For example, the shape of a tree is irregular or organic.

In plane geometry, the two-dimensional shapes are **flat shapes** and **closed figures** such as circles, squares, rectangles, rhombus, etc. In solid geometry, the three-dimensional shapes are cube, cuboid, cone, sphere and cylinder. We can observe all these shapes in our daily existence also. For example, books (cuboid shape), glasses (cylindrical shape), traffic cones (conical shape) and so on. In this article, you will learn different geometric shapes and their definition along with examples.

### A. DEFINITION

Geometrical shapes are the figures which represent the forms of different objects. Some figures are two-dimensional, whereas some are three-dimensional shapes. The two-dimensional figures lie on only the x-axis and y-axis, but 3d shapes lie on the x, y and z axes. The z-axis shows the height of the object. As we have already discussed in the introduction, there are different shapes defined in geometry.

To draw or design any of these figures start with a line or a line segment or a curve. Depending upon the number and arrangement of these lines, we get different types of shapes and figures like a triangle, a figure where three line segments are connected, a pentagon (five-line segments) and so on. But every figure is not a complete figure.

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## **The Author's Biography**

Rizky Vita Losi, S.Pd.I, M.Hum. was born in Medan, June 18, 1992. She continued her undergraduate education majoring in English Education at the Faculty of Tarbiyah and Teacher Training at the State Islamic Institute of Medan, North Sumatra (now it becomes the State Islamic University of North Sumatra) and graduated in 2014. In the same year, she continued her postgraduate education at the State University of Medan and graduated in 2016. Her teaching experience began in 2016 at several universities such as: Institut Kesehatan Helvetia, the State Islamic University of North Sumatra and Medan Area University as an English Lecturer. Then, in 2019, she started teaching at University of Pembangunan Panca Budi Medan as a permanent lecturer there. The author is active as a teaching staff at the Faculty of Science and Technology, University of Pembangunan Panca Budi. Beside teaching, she is also active in conducting researches and community services, and also become a speaker for several trainings and seminars. The author is also active in publishing articles and books.

**T**his book is written to fulfill students' needs to learn English in Mathematics terms. This book is designed to provide an opportunity to develop students' English skills more communicatively and meaningfully. It consists of 9 units. Each unit presents sections of listening, speaking, reading, writing, and grammatical focus. In listening section consists of exercises related to the listening record of Math terms. In speaking section, the students are provided with examples and vocabularies followed by practical activities which are presented in various ways. In reading section, the students are given some texts related to Math terms. Meanwhile, in writing section, some sentence patterns and exercises are designed with guided writing exercises. The materials have been arranged in accordance with the students' language levels.



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