

WARM-UP

1

Lets practice using algebraic language. Write down an expression and calculate.

Six more than 17 _____

Five less than 25 _____

A seven increased by 5 _____

The product of eight and 6 _____

Three times as large as 5 _____

Five times as large as 8 _____

Four times the sum of 5 and 6 _____

2

Open parentheses:

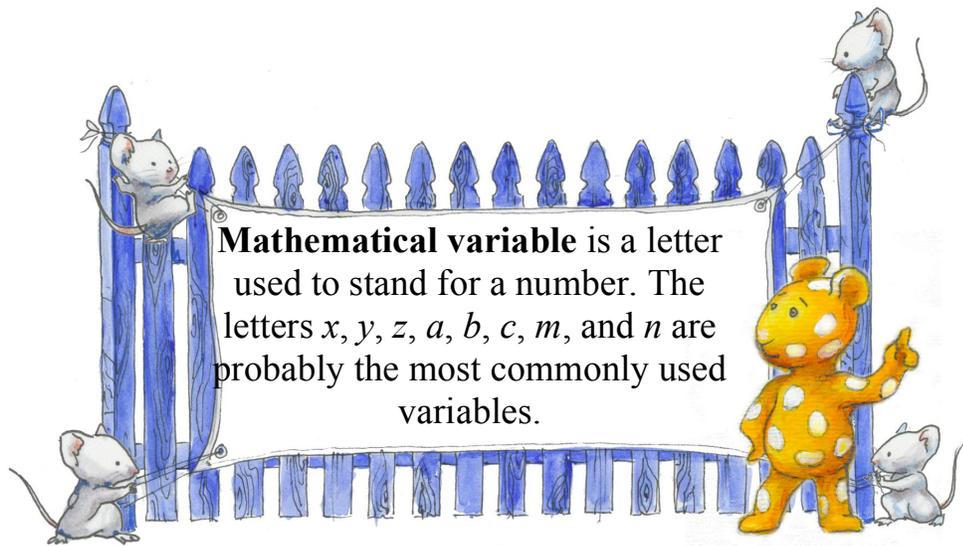
$15 + (8 + 2) =$

$15 - (8 + 2) =$

$15 + (8 - 2) =$

$15 - (8 - 2) =$

NEW MATERIAL



The most common use for variables is to represent something that is currently unknown, but that we would like to know

For example in equation: $5 + \square = 9$

Instead of using an empty box in place of an unknown number you can use a letter, for example letter x .

$$5 + x = 9$$

Now, instead of figuring out what is the number in the box, you can find what x equals.

An equation is a mathematical statement that asserts the equivalence of two expressions.

For example, the assertion that “two plus five equals seven” is represented by the equation

$$2 + 5 = 7$$

In many cases, an equation contains one or more variables. These are still written by placing each expression on either side of an equals sign (=).

For example, the equation $x + 3 = 5$, read “ x plus three equals five”, asserts that the expression $x + 3$ is equal to the value 5.

1 Find the x in the following equation:

$$x + 26 = 73$$

2 Find the x in the following equation:

$$12 + x = 69$$

In the different problems a letter (**variable**) can represent a different number. But in each equation a variable stands for a single number and does not vary!

Lesson 3 Variables

3

Give the algebraic expression for each of the following.

The sum of a number and 5 _____

The number minus 4 _____

Six times a number _____

4

Evaluate an expression $(7 + x)$:

If $x = 5$: _____

If $x = 10$: _____

If $x = 120$: _____

5

Simplify the following expressions:

$$29 + x + 13 - 29 + 3x =$$

$$34 + x - 34 - x =$$

$$x + x - x + x - x - x =$$

6*

Evaluate the expressions below for $x = a$, and $y = 6$.

$$2x + y =$$

$$6 - 2xy =$$

$$5y - 2x =$$

$$5xy + 4x + 3y + 2 =$$

7

Maggie is n years old. Her mother is 4 times as old as Maggie is. Her father is 3 years older than her mother.

a) Express her father's age in terms of n .

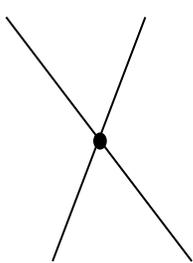
b) How old is her father when Maggie is 9 years old?

REVIEW

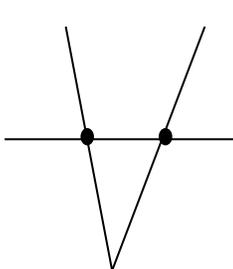
- (AB) – Straight line through points A and B;
- [AB) – Ray AB with end point A passing through B
- [AB] – segment of the line with end points A and B
- (AB) // (CD) – lines AB and CD are parallel

1.

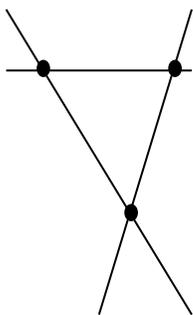
a) How many straight lines, rays, and line segments can you find in each figure.



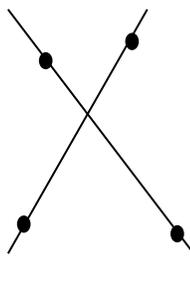
- Straight lines
 - Rays
 - Line segments



- Straight lines
 - Rays
 - Line segments

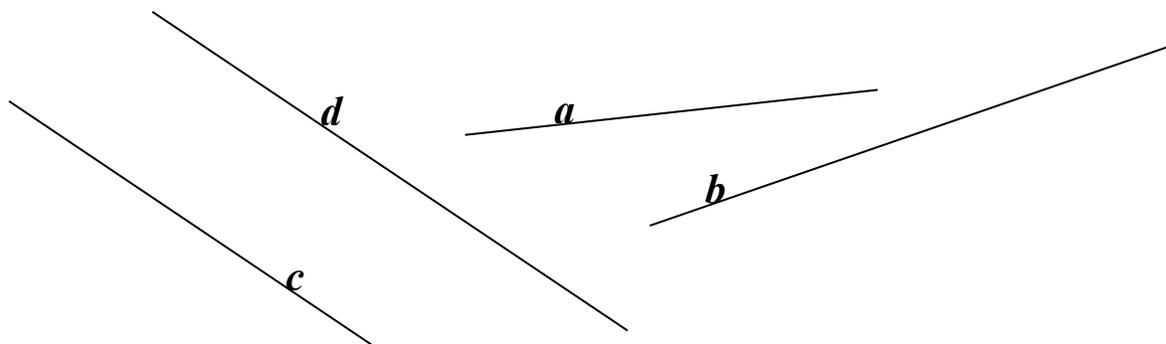


- Straight lines
 - Rays
 - Line segments

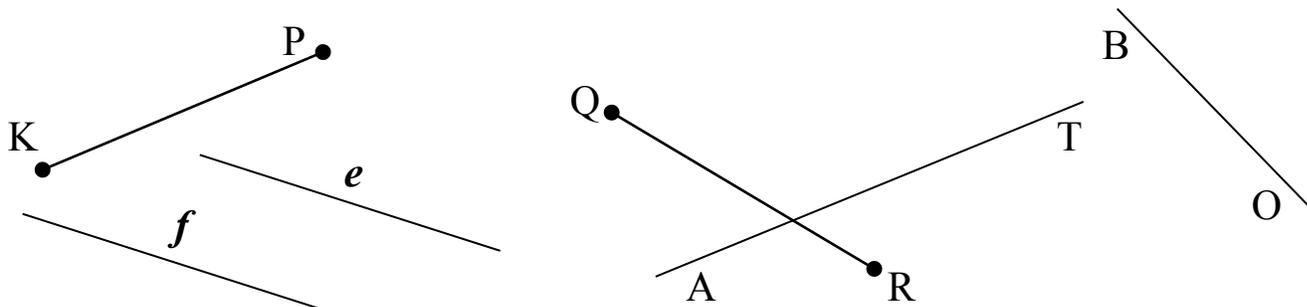


- Straight lines
 - Rays
 - Line segments

b) Using a ruler, extend lines *a* and *b*. Find their intersection points with other lines and label them by any letters you choose. Which lines are parallel to each other?



c) Find straight lines and line segments. Trace the line segments with your pencil. Which of them intersect? Extend the lines using a ruler and mark the intersections points.



Challenge yourself

Rana, Toni and Millie are sisters. Find out who is 9 years old, who is 12 and who is 14. You have two clues:

Clue 1: Toni's age is not in the 4-times multiplication table.

Clue 2: Millie's age can be divided exactly by the number of days in a week.

	9 yrs	12 yrs	14 yrs
Rana			
Toni			
Millie			

Did you know ...

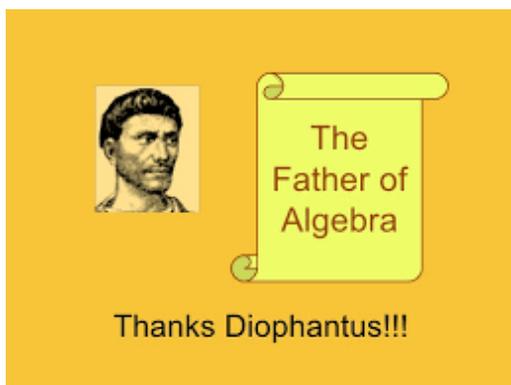
There fundamental ideas that relate to algebra were discovered multiple times by different people who weren't aware of the discoveries being made in other parts

Lesson 3 Variables

of the world. In ancient times, it was common for discoveries to be made in parallel by different people, as news was slow to travel.

Ancient Babylon and Egypt are the two places that were at the center of the development of algebra. Both of these civilizations used algebra in different ways and for different reasons, but it's generally accepted that it was the Babylonians who first made basic use of algebra and pioneered its beginnings in the field of mathematics. There is evidence of this that dates back as far as 1900 to 1600 BC. The tablet known as the Plimpton 322 tablet displays Pythagorean triples and other forms of mathematics.

Greek philosopher Diophantus wrote 13 books on the subject, but only six of them have survived. He was the first person to begin using symbols to represent unknown numbers. Of course, many of the symbols that Hellenistic mathematicians that followed Diophantus began to use are not in use today. Things have changed and developed. But what matters most is that the use of symbols was first employed during this period, and this concept has remained, even if the symbols themselves have changed.



In the 17th century, the use of 'x' to represent an unknown variable came into being. Most historians of mathematics now agree that it was Rene Descartes who was responsible for this particular development. It's thought that it was first used in published form in his treatise called *La Géométrie*, published in 1637. It's a symbol that is still used by mathematicians and students. Descartes began by using a range of letters before eventually selecting x as the most common variable name.

