

Algebra Basics



Curriculum Ready

ACMNA: 133, 175, 176, 177, 179



www.mathletics.com



Empty rounded rectangular box for notes.

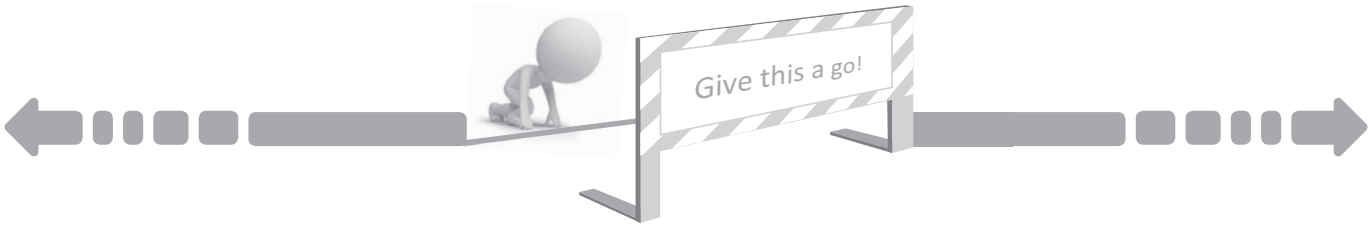
Large empty rounded rectangular box for notes.

Fill in the spaces with anything you already know about Algebra

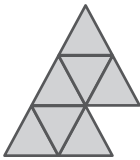
Empty rounded rectangular box for notes.

Empty rounded rectangular box for notes.

Career Opportunities:
Architects, electricians, plumbers, etc. use it to do important calculations.

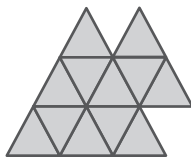


Q Triangles have been stacked to form an increasing number pattern below:



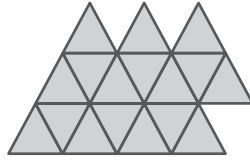
7 triangles

,



12 triangles

,



17 triangles

,...

How many small triangles would be needed to make the 15th picture in this pattern?

Work through the book for a great way to solve this

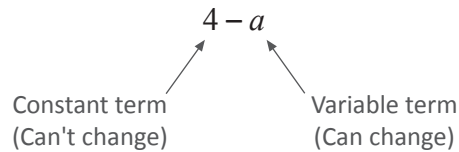




Words and symbols

Algebra uses letters or symbols called **variables**. Each part in an algebraic expression is called a **term**.

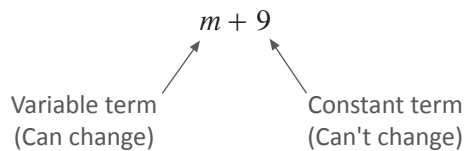
Look at the algebraic expression $4 - a$



if a is 1, the outcome is 3
If a is 8, the outcome is -4

Let's look at another similar expression.

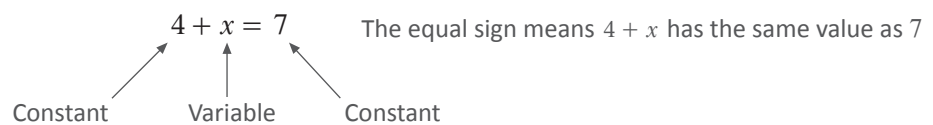
$m + 9$



If m is 3, the outcome is 12
If m is -4 , the outcome is 5

Algebraic expressions with an equals sign '=' are called equations.

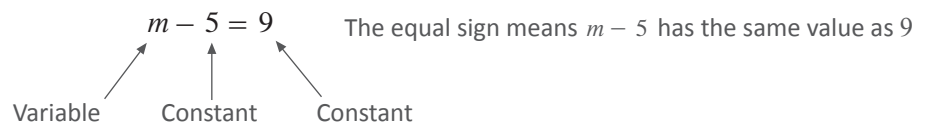
$4 + x = 7$



To make this correct, x must be 3

Here's another one.

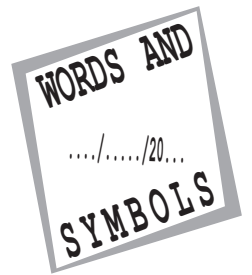
$m - 5 = 9$



To make this correct, m must be 14



Words and symbols



1 Write down the variable in each of the following mathematical statements:

a $12 + b$

b $3 - m + 2$

c $7 \times k + 3$

d $2a + 3a$

2 Circle each of the algebraic expressions below in which the variable can be **any** value:

$$5 \times w = 30$$

$$x \div x = 1$$

$$32 - 2 \times d = 16$$

$$3 + x =$$

$$12 \times g =$$

$$200 \div s = 25$$

$$3 \times x + 6 =$$

3 Match up each of the algebraic expressions with the correct outcome using the given variable value:

$$11 - x \text{ if } x = 4 \bullet$$

$$\bullet 20$$

$$4 \times m \text{ if } m = 5 \bullet$$

$$\bullet 10$$

$$27 \div a \text{ if } a = 3 \bullet$$

$$\bullet 9$$

$$1 + 3 \times z \text{ if } z = 3 \bullet$$

$$\bullet 7$$

4 Write down the value of the variable that makes these equations equal on both sides:

a $12 + c = 20$

b $14 - h = 2$

$$c =$$

$$h =$$

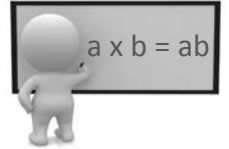
c $k \div 3 = 6$

d $12 \times y = 72$

$$k =$$

$$y =$$

Multiplication



Instead of writing $5 \times m$ or $a \times b$, we simply write $5m$ or ab to mean the exact same thing!

Always put the number first.

Simplify $3 \times 2 \times n$

$$3 \times 2 \times n = 6 \times n$$

$$= 6n$$

Multiply the numbers together

If multiplying by 1, do not write 1 in front of the variable.

Simplify $1 \times y$

$$1 \times y = y \quad (\text{not } 1y)$$

The 1 is hidden

1×2 is just 2. The same rule applies when multiplying a variable by 1

Write multiplied variables in alphabetical order.

Simplify $2 \times p \times 5 \times r \times q$

$$2 \times p \times 5 \times r \times q = 2 \times 5 \times p \times r \times q$$

$$= 10 \times p \times r \times q$$

$$= 10pqr$$

Re-order with numbers first

Multiply the numbers first

Put variables in alphabetical order

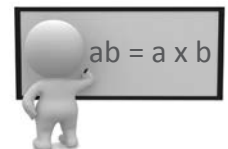
Use powers to simplify multiplications of the same variable.

Simplify $a \times a \times b$

$$a \times a \times b = a^2 \times b$$

$$= a^2b$$

Just like 4×4 is 4^2 , $a \times a$ is a^2



Doing the opposite of these examples is called **expanding**.

Write a^2b in expanded form

$$\therefore a^2b = a \times a \times b$$

Simplified form \nearrow \nwarrow Expanded form



Multiplication



1 Simplify: (psst: remember the rules!)

a $2 \times 7 \times k$

b $u \times 1$

c $5 \times r \times p$

d $n \times m \times m$

e $6 \times b \times 3 \times b$

f $4 \times j \times l \times 3 \times k$

2 Expand each of these

a $4pq$

b $4a^2$

c $3m^2n$

3 It's combo time! Calculate the value of these expressions using the variable in the square brackets.

a $3x + 2$ $[x = 4]$

b $15 - 2b$ $[b = 6]$

c $3 \times 5g$ $[g = 2]$

d $4m^2$ $[m = 3]$

