



ALL IN ONE PLACE BASE CAMP MATHEMATICS ALGEBRA ACTIVITY 1



INSTRUCTIONS

- There is no time limit for the activity – work at your own pace
- Ask a family member or friend for help if you need it
- Write neatly in your Maths workbook or on the activity sheet
- Use the solution sheet to check your work
- Avoid using calculators

WHY LEARN ALGEBRA?

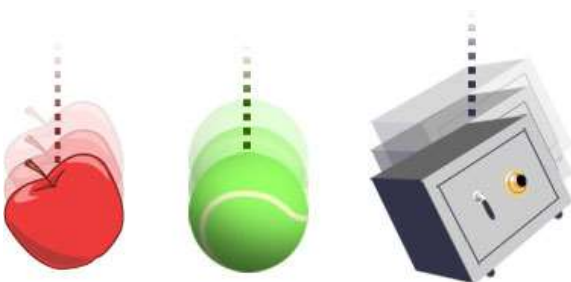
To many people, algebra seems like a mystery. Some students ask:

‘Why use letters instead of numbers in Maths?’

‘How will we ever use algebra in our lives?’

‘What is the point of writing equations in algebra?’

Good questions! The answers will be simple once you have completed the Algebra activities. But for now, understand that we use algebra to solve problems which cannot be solved using arithmetic. Also, algebra helps us to understand many real-life situations. For example, we use algebra to calculate how long it will take a stone to hit the ground when dropped from a tree, or the time taken for a satellite to orbit the Earth.



THE SEE-SAW EXAMPLE

Let's say that a friend was sitting at one end and you knew your friend's weight.

You'd like to sit on the other side of the see-saw, but not at the very end. You want to sit opposite your partner in the middle between the seat and the pivot point.

Using algebra, you could calculate how heavy you'd have to be to exactly balance the see-saw.



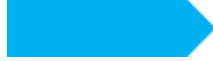
JUMP 1

Read the short text about the history of algebra and answer the questions.

Classical algebra was first developed by the ancient Babylonians and the Egyptians. They were able to solve for unknown quantities called variables and had formulas and equations. The Chinese began to use their own algebra around 100 BC.

Modern algebra started in the past 200 years. This can be a complicated study of abstract ideas that are useful for mathematicians and scientists. Modern algebra is used to calculate information about space and time.

The word "algebra" means the re-union of broken parts. The word comes from Arabic. It was first used around 800AD by Arabic scholars, and is still in our language today. Once even the basics of algebra were only studied by advanced mathematicians and scientists in ancient civilizations, but now everybody learns it in school!



a. What did the Babylonians call unknown quantities?

ANSWER _____

b. What do you think the Egyptians built with the help of algebra?

ANSWER _____

c. Which was the third civilization to use algebra?

ANSWER _____

d. Name the two types of algebra.

ANSWER _____ and _____

e. What does the word algebra mean?

ANSWER _____



JUMP 2

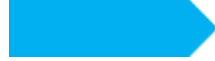
Before you begin algebra questions using letters, you can practise some easy problems using symbols.








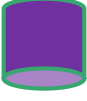













In each equation in the table, a symbol represents a particular number. Work out the value of the symbol. The example shows you what to do.

EXAMPLE

$$\begin{array}{c} \text{Smiley Face} \end{array} \times \begin{array}{c} \text{Smiley Face} \end{array} = 16 \qquad \begin{array}{c} \text{Smiley Face} \end{array} = 4$$

The only two identical numbers that multiply to give an answer of 16 are 4 and 4.



 + 7 = 15	 =
 - 12 = 10	 =
 x 7 = 84	 =
 x  = 49	 =
 x  x  = 8	 =
56 ÷  = 7	 =
 ÷ 8 = 8	 =
 x 4 + 4 = 10 x 2	 =
 ÷ 2 + 2 = 9 x 3	 =



JUMP 3

Good job! Now for some practise using letters.

In each question, the letters represent these numbers:

$$\mathbf{a} = 2$$

$$\mathbf{b} = 1$$

$$\mathbf{c} = 4$$

$$\mathbf{d} = 5$$

Find the value for each expression using the variables or numbers.

a. $\mathbf{a} + \mathbf{b} + \mathbf{c} =$

ANSWER _____

b. $\mathbf{a} + 2\mathbf{b} \times \mathbf{d} =$

ANSWER _____

c. $\mathbf{a} \div 2\mathbf{b} - \mathbf{b} + \mathbf{c} =$

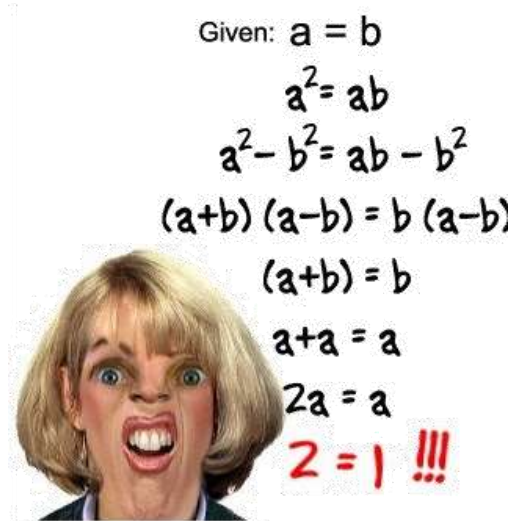
ANSWER _____

d. $\mathbf{d} \times \mathbf{a} \times 2\mathbf{b} \div \mathbf{c} =$

ANSWER _____

e. $\mathbf{d}^2 + \mathbf{c}^2 - \mathbf{a} + \mathbf{b} =$

ANSWER _____





JUMP 4

In this exercise, you'll step things up a bit using brackets and negative numbers – and improve your BIDMAS skills.

Find the answer to each expression using these variables:

$$w = 2$$

$$x = 4$$

$$y = 6$$

$$z = 10$$

a. $(x - w) \times y =$

ANSWER _____

b. $(w - x) \times z =$

ANSWER _____

c. $(z - y) - (x - z) =$

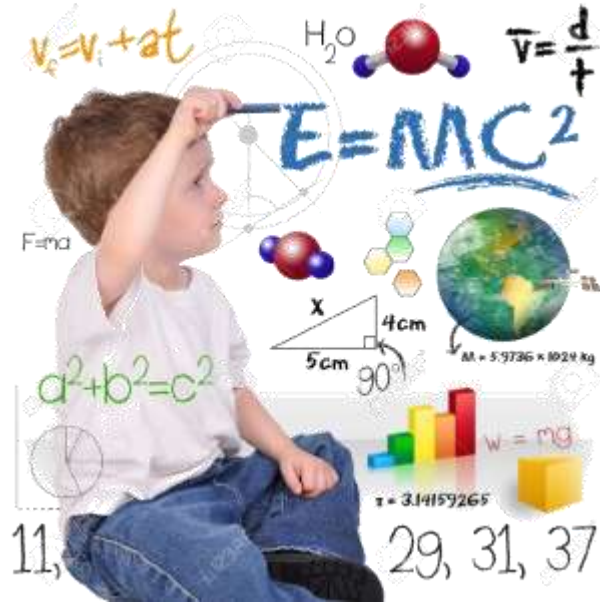
ANSWER _____

d. $z/w + (y - z)^2 =$

ANSWER _____

e. $(x/w)^2 - y/w^2 =$

ANSWER _____





JUMP 5

The sum of two variables **a** and **b** is shown below.

$$a + b = 10$$

In the table write all the possible values for the given product or multiplication.

EXAMPLE

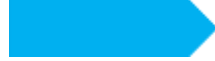
If $ab = 25$ then $a = 5$ and $b = 5$

REASONING

$$a + b = 5 + 5 = 10 \quad \text{and} \quad a \times b = 5 \times 5 = 25$$

$ab = 16$	$a = \underline{\quad\quad}$ and $b = \underline{\quad\quad}$ or $a = \underline{\quad\quad}$ and $b = \underline{\quad\quad}$
$ab = 21$	$a = \underline{\quad\quad}$ and $b = \underline{\quad\quad}$ or $a = \underline{\quad\quad}$ and $b = \underline{\quad\quad}$
$ab = 0$	$a = \underline{\quad\quad}$ and $b = \underline{\quad\quad}$ or $a = \underline{\quad\quad}$ and $b = \underline{\quad\quad}$





JUMP 7

Now time for a speed test. You are given the values of two variables.

$$p = 2 \quad q = 7$$

See how quickly you can find the answers to the expressions in the table. It might be fun to compete with a friend or classmate and see finishes first and gets the answers correct!

Expression	Answer
$p + q$	
$p - q$	
$2p + 2q$	
$p - 3q$	
p^2	
$p^2 + q^2$	
$(p - q)^2$	
$p - 2q - 10$	
$(q - 3p) - (p - q)$	





JUMP 10

Lance has 3 hamsters (h), 6 guinea pigs (g) and 9 cats (c).

a. Write an expression showing the total number of pets Lance has.

ANSWER _____

b. Write your expression in the simplest form.

ANSWER _____



JUMP 12

Alex has twice as many sweets as Barry. Catherine has twice as many sweets as Barry. Let the number of sweets that Alex has be **A**.

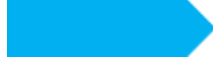
a. Write an expression for the total number of sweets that all three friends have in terms of **A**.

ANSWER _____

b. If they have 28 sweets altogether, how many sweets does Barry have?

ANSWER _____

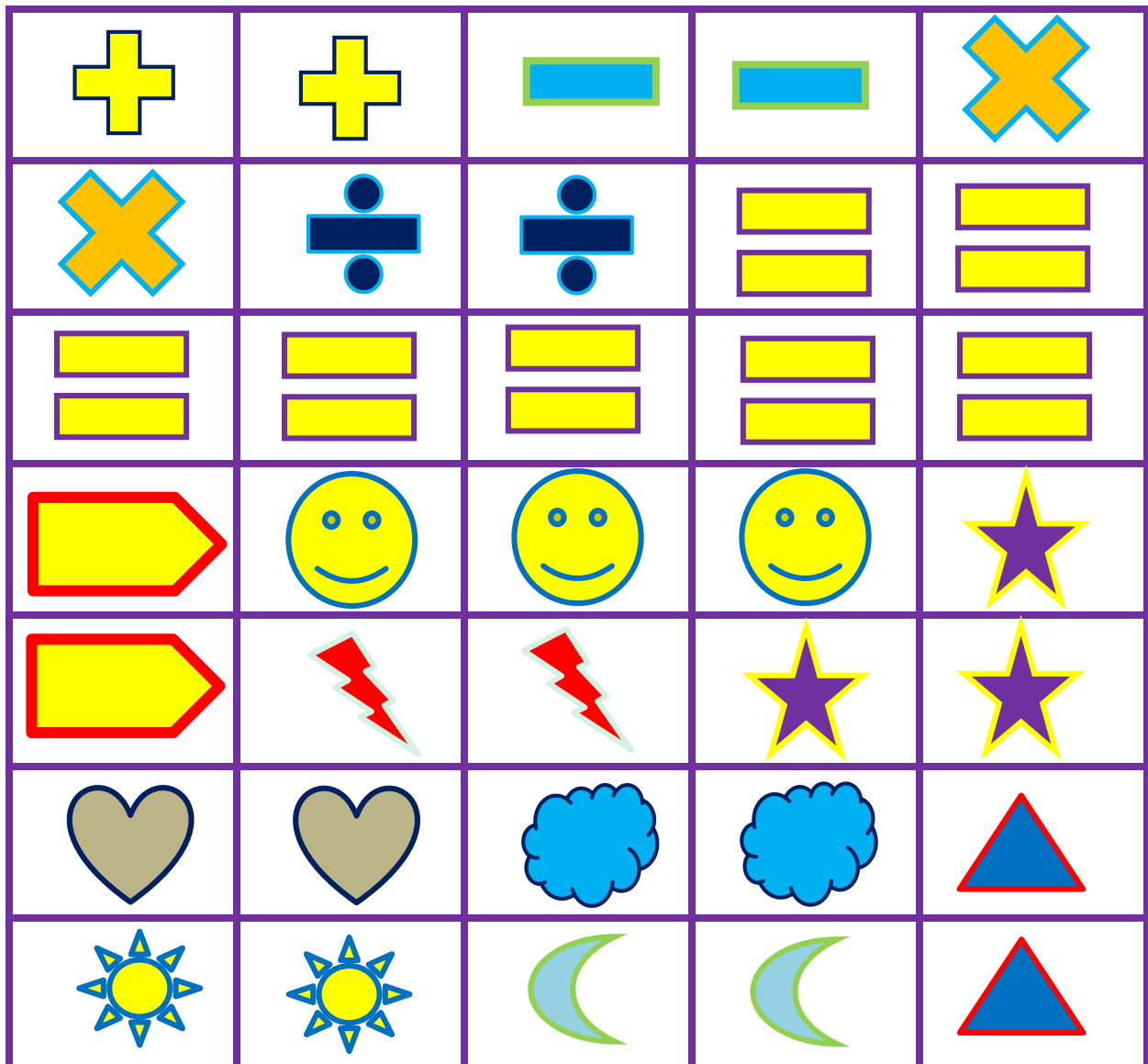


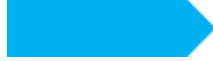


JUMP 14

Cut out these shapes and operations and make your own equations. You can also make your own shapes and numbers. You may need to draw more operation signs. Look back at Jump 2 and you'll remember what to do.

Have fun testing your friends and family!





Cut and paste the **CHECK POINT** into your workbook.



CHECK POINT

MATHS ALGEBRA ACTIVITY 1

How much have you improved in your understanding of algebra?

Write a number from 1 to 10 and be honest – you are assessing yourself.

I've jumped _____

Decide if these statements apply to you. Tick them if they do!

1. I understand why letters are used in algebra.
2. I understand how we use algebra in our lives.

LEARNING OUTCOMES

Write your name in the table and ask a parent, teacher or tutor to decide **YES** or **NO** for each learning outcome or success criterion.

My name is _____ and I can	
<i>explain why we use symbols to represent numbers in algebra.</i>	YES or NO
<i>define what a variable is.</i>	YES or NO
<i>answer algebra expressions with + - x and ÷ operations.</i>	YES or NO
<i>use the principles of BIDMAS in algebra.</i>	YES or NO
<i>use algebra to solve real life word problems.</i>	YES or NO