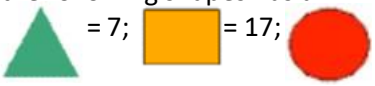
Y6 - Algebra

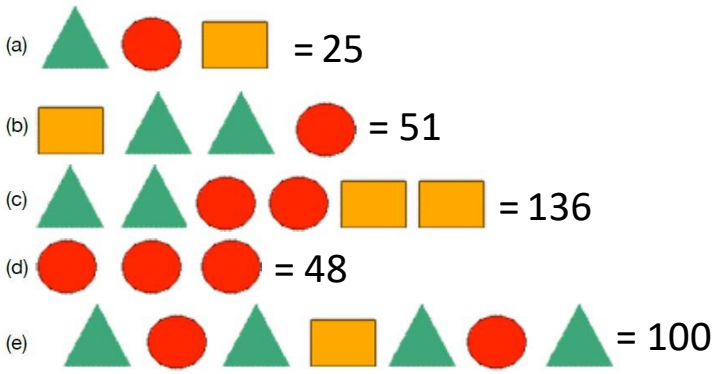
In Year 6, children will learn explicitly about **algebra** for the first time. They will be expected to work with simple formula (e.g. 20 = 4a + 4) and must be able to use an algebraic formula to describe and generate linear number sequences (e.g. What is the formula for this sequence: 4, 8, 12, 16?) They will also encounter algebraic formulae where there are two unknowns (e.g. a = b = 11), and must be able to calculate the different possibilities of combinations of values (4a + 4 = b; if a = 5, what is the value of b?). Finally, they will be exposed to missing number problems for which they will be expected to write an algebraic formula (e.g. A plumber charges £9 an hour. She is currently offering a £5 discount for all jobs. Write a formula to calculate how much money she should charge her customers.)

Activities & Games:

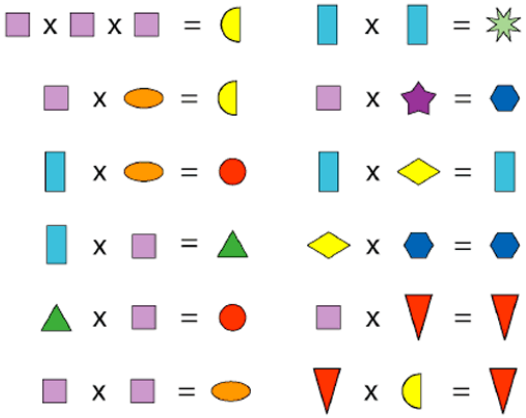
☆ **What's it worth?**

Each of the following shapes has a value:  = 7; = 17; = ?

The value of the circle changes in each problem. Can you calculate what it is for each one?



☆☆ **Shape Times Shape:** The coloured shapes stand for eleven of the numbers from 0 to 12. Each shape is a different number. Can you work out what they are from the multiplications below?



☆☆☆ **Fruit bowl:** 7 pears and 1 banana cost 57p; 3 bananas, 1 pear and 2 apples cost 41p; 1 pear, 2 apples and 2 bananas cost 33p. How much does 1 piece of each fruit cost?

☆ **Simple formula:** Complete these tables:

3a = 15	a =
5b = 10	b =
63 = 9c	c =
12d = 48	d =

20 = 4a + 4	a =
3b + 5 = 11	b =
14 = 6c – 4	c =
2d – 5 = 5	d =

a	4**a**	4**a** + 2
12		
	36	
		102

☆ **Linear number sequences:** The formula **4n + 1** can be used to generate numbers in this sequence. Complete the table.

1st	2nd	3rd	4th	5th	10th	20th
5					41	

☆☆ **nth term:** 0.7, 1.2, 1.7…. If 0.7 is the 1st term in this sequence, what is the 7th?

☆☆ **Do you agree?** Toby is finding a pair of numbers to fit the equation: **2a + b = 15**. Both letters represent whole numbers. Toby says: "One of the numbers must be odd, the other must be even." Do you agree? Explain your reasoning.

Going deeper...

Think of Two Numbers

Here is an alternative, and more unusual, version of the "Think of a Number" trick, which you may have heard of before.
Think of two whole numbers under 10 .

Take one of them and add 1 .
Multiply by 5 .
Add 1 again.
Double your answer.
Subtract 1 .

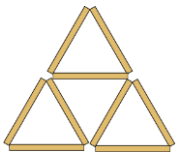
Add your second number.
Add 2 .
Double again.
Subtract 8 .
Halve this number and tell me your answer.

From your answer, I can work out both your numbers very quickly. How?
Choose some different pairs of numbers and repeat the process.
Can you figure out how the trick works?

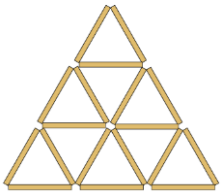
Sticky Triangles

I was exploring a puzzle in which headless match sticks had to be moved to make a different number of triangles. I made one small triangle. I made it into 4 small triangles by adding 6 matches. I added another row and counted the number of small triangles and counted the matches.

3 matches



9 matches



I made a table of my results and continued adding rows. I found many patterns. Have a go and see what patterns you can find. You do not have to use match sticks (or cocktail sticks) - drawing lines will do just as well. Find a good way to record your results. See if you can predict the numbers for rows of triangles you have not drawn. When you have done all you can with triangles, see if you get the same sort of results with squares. Then think of other shapes which might make number patterns as they grow.

Wonderful websites

Algebra explained!

Algebra Games

Whilst it can be very tempting to encourage your child to have a go at the more challenging activities, it is far better to work with them at a level they feel confident with. Significant and regular practise of even the most basic skills outlined in this document will lead to a much deeper understanding and greater proficiency, and ultimately a much more pleasant 'homework' experience for you and your child!