

Maths - Year 6

Pattern and Algebra 3: Using algebra to solve problems

Key Vocabulary

Term	One of the numbers in a sequence.
Infinite	Limitless or endless.
Finite	Limited in size or extent.
Equation	A statement that the values of two mathematical expressions are equal (indicated by the sign =).
Expression	A combination of numbers, variables and function e.g. $2n + 6$
Algebra	The part of mathematics in which letters and other general symbols are used to represent numbers and quantities in formulae and equations.
Simplify	Reduce to the smallest possibility.

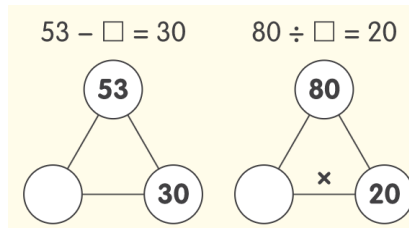
Mathematical Skills

- Describe a relationship between numbers.
- Represent a relationship between numbers algebraically.
- Use conventional algebraic notation e.g. $3a$ to indicate $3 \times a$.
- Identify whether an equation has one or many possible solutions.
- Solve an equation and explain reasoning.
- Work systematically to find all possible solutions to an equation.
- Express and solve problems algebraically.

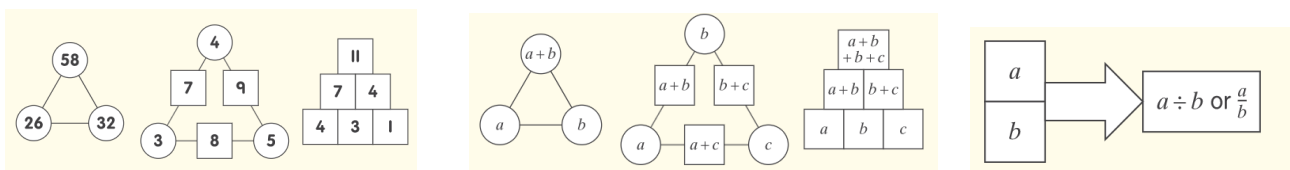
Mathematical Methods

- Exploring empty box problems.

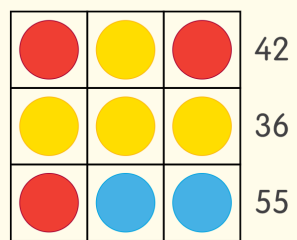
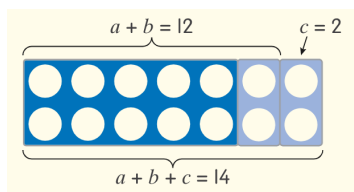
- $\square + 34 = 60$ is solved by $60 - 34 = \square$
- $23 + \square = 60$ is solved by $60 - 23 = \square$
- $\square - 14 = 30$ is solved by $30 + 14 = \square$
- $\square \times 6 = 48$ is solved by $48 \div 6 = \square$
- $4 \times \square = 48$ is solved by $48 \div 4 = \square$
- $\square \div 6 = 20$ is solved by $20 \times 6 = \square$



- Using symbols and letters to express missing numbers.




- Solving problems using algebra.



$y = 12.$

- if $y = 12$ then $2r + 12 = 42$; so the first row is worth the same as 2 red Counters plus 12
- this means that $2r = 30$; that is, subtracting 12 from the value of the first row gives the value of 2 red Counters
- if $2r = 30$ then $r = 30 \div 2 = 15$; that is, the value of a red Counter is the number which doubles to give 30, which is 15.

- Finding all possibilities for two variables e.g. Dev has bought 3 packs of strawberry yogurts and 2 packs of peach yogurts for a picnic. The packs of strawberry yogurts contain a different number of pots from the packs of peach yogurts. There are 30 pots of yogurt altogether. How could we represent this?



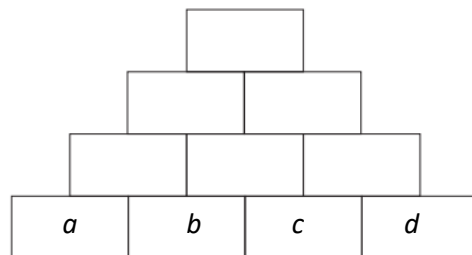
$\blacksquare + \blacksquare + \blacksquare + \blacktriangle + \blacktriangle = 30$

$3 \times \square$	$2 \times \square$	$= 30$
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- if the number of yoghurts in a strawberry pack is a there are $3a$ strawberry yoghurts
- if the number of yoghurts in a peach pack is b there are $2b$ peach yoghurts
- since there are 30 pots of yoghurt altogether, $3a + 2b = 30$.

Can you..?

- Can you use algebraic notation to express how to solve this adding pyramid? The bottom row has been done for you.



- Can you use algebraic notation to express these missing number problems?

$$18 \times ? = 126$$

$$\blacksquare + \bullet = 78$$

$$\blacktriangle \times \blacktriangle = ?$$