Templars Primary School Knowledge Organiser

Year 6 Algebra

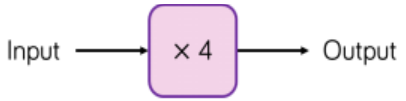
Key Vocabulary

- term to term rule
- variation
- unknown
- expression
- formula
- one/two step equation
- substitution
- unknown
- enumerate
- input/output
- balancing method

Find a rule – 1 step and 2 step

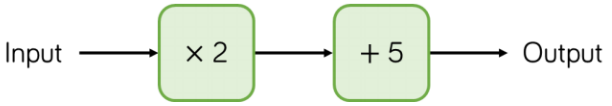
For each number we put into a function machine, there is an output. We can also "work backwards" by doing the inverse to find the input if we are only given the output.

A one-step function is where they perform just one operation on the input.



- What is the output if the input is 2? 2 x 4 = 8
- What is the output if the input is 7.2? 7.2 x 4 = 28.8
- What is the input if the output was 20? 20 ÷ 4 = 5
- What is the input if the output was 22? 22 ÷ 4 = 5.5

A two-step function is where they perform two operations on the input.



- What is the output if the input is 5? 5 x 2 + 5 = 15
- What is the input if the output is 19? 19 – 5 ÷ 2 = 7
- What is the output if the input was 3.5? 3.5 x 2 + 5 = 12

Forming expressions

An expression is a group of numbers, letters and operation symbols.

Add 14 to a	$a + 14$
Subtract 20 from b	$b - 20$
Multiply c by 4	$4c$
12 more than d	$d + 12$
Multiply e by 3 and subtract 5	$3e - 5$
Add 12 to f and then multiply by 2	$2(f + 12)$

Substitution

If ★ = 7 and ♥ = 5, what is the value of:

★ + ♥ + ♥

7 + 5 + 5 = 17

Substitute the following to work out the values of the expressions.

$w = 3 \quad x = 5 \quad y = 2.5$

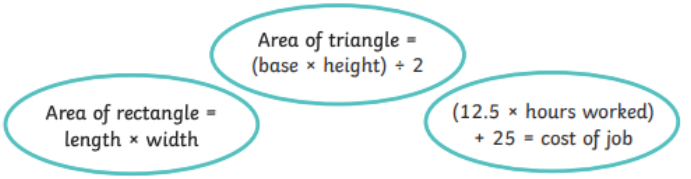
$w + 10 = 3 + 10 = 13$

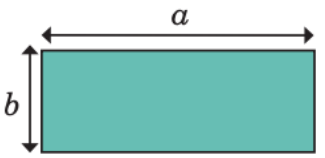
$w + x = 3 + 5 = 8$

$y - w = 2.5 - 3 = -0.5$

Formulae

A **formula** is a special type of **equation** that shows the relationship between different substituted variables. Formulas or formulae are often used in geometry to find area and volume.





a = 17cm and b = 8cm

Area = a x b

Perimeter = $2a + 2b$

What would the formula be to calculate this? How much does the dog walker charge for a 3-hour job?

c = cost h = hours

$c = 12h + 5$

$c = 12 \times 3 + 5 = £41$

Forming equations

$a + 14 = 20$

$b - 20 = 15$

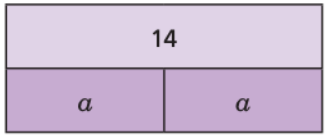
$4c = 28$

$d + 12 = 30$

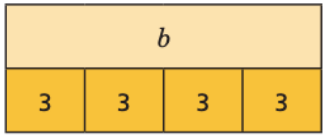
$3e - 5 = 10$

$2(f + 12) = 44$

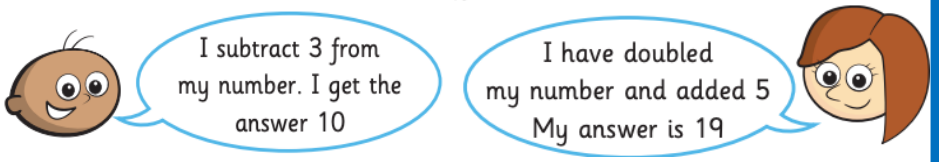
An **equation** is a number statement with an equal sign (=). **Expressions** on either side of the equal sign are of **equal value**.



2a = 14



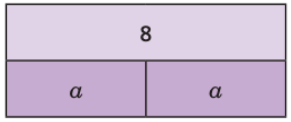
$\frac{b}{4} = 3$



$x - 3 = 10$

$2x + 5 = 19$

One-step equations



$2a = 8$

$8 \div 2 = 4$

$a = 4$

$a = 7 + 6$

$a = 13$

$x + 7 = 20$

$20 - 7 = x$

$x = 13$

$10y = 80$

$y = 80 \div 10$

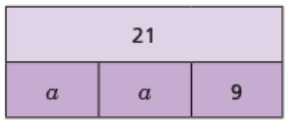
$y = 8$

$\frac{u}{6} = 3$

$u = 6 \times 3$

$u = 18$

Two-step equations



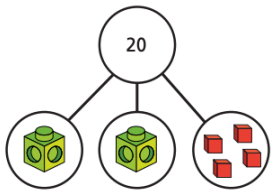
$2a + 9 = 21$

$2a = 21 - 9$

$2a = 12$

$a = 12 \div 2$

$a = 6$



$2a + 4 = 20$

$2a = 20 - 4$

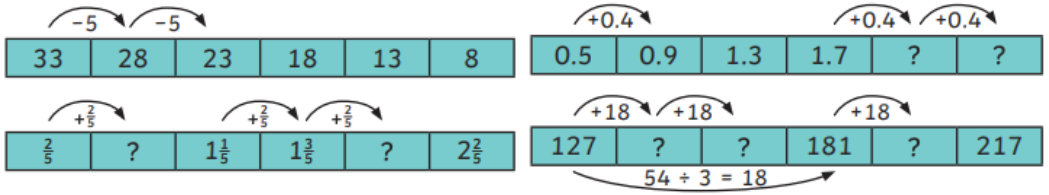
$2a = 16$

$a = 16 \div 2$

$a = 8$

Linear number sequences

A **linear number sequence** is a sequence where each value increases or decreases by the same amount each time. Each number in a linear number sequence is called a **term**. The constant change between each number is called the **term to term** rule. To identify the **term to term rule**, find the difference between two terms next to each other. When you know the **term to term rule**, you can use it to find the next number in the **sequence**. It can also be used to find a missing number within a sequence.



Find pairs of values

In an equation with two unknown numbers, we need to use our understanding of substitution and trial and error or work systematically to consider what possible values a pair of variables can take.

$ab = 18$

a	b
1	18
2	9
3	6
6	3
9	2
18	1

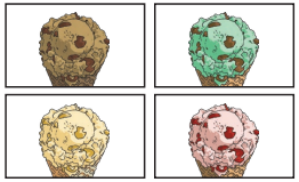
$2a + b = 10$

a	b
2	6
3	4
4	2
5	0

Enumerate possibilities

Enumerating means making a complete list of answers to a problem. Use a system to find the possibilities and organise your findings in an ordered list or table.

There are four ice cream flavours.



Two scoops of two different flavours give 6 possible combinations:

- Chocolate and strawberry
- Chocolate and vanilla
- Chocolate and mint
- Strawberry and vanilla
- Strawberry and mint
- Vanilla and mint