

1. Understanding Expressions & Substitution

Algebra uses letters called **variables** to represent unknown numbers

$x \times 0 = 0$ Anything multiplied by zero is zero.

$x \times 1 = x$ Anything multiplied by 1 is itself.

$x \times 2 = 2x$ We can leave out the \times sign.

$x \times x = x^2$ Anything multiplied by itself is the same as squaring it.
The 2 sign means squared.

$b \times 2a = 2 \times a \times b = 2ab$

$4x \times 3y = 4 \times 3 \times x \times y = 12xy$

$5a \times 2b = 5 \times 2 \times a \times b = 10ab$

$3a \times 6a = 3 \times 6 \times a \times a = 18a^2$

$x + 2$ An unknown number add 2

If $x = 6$, $x + 2 = 6 + 2 = 8$

$2x$ An unknown number multiplied by 2

If $x = 6$, $2x = 2 \times 6 = 12$

$\frac{x}{2}$ An unknown number divided by 2

If $x = 6$, $\frac{x}{2} = \frac{6}{2} = 3$

$2x - 3$ An unknown multiplied by 2 then subtract 3

If $x = 6$, $2x - 3 = 2 \times 6 - 3 = 9$

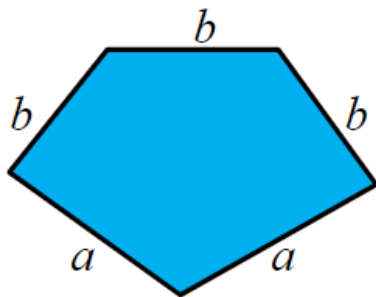
$\frac{x + 4}{2}$ An unknown number add 4, then divided by 2

If $x = 6$, $\frac{x+4}{2} = \frac{6+4}{2} = 5$

2. Simplification

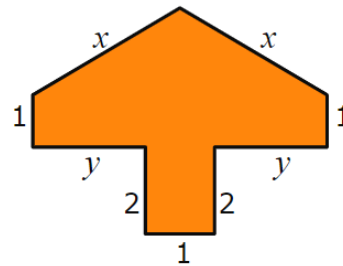
When we add **like terms** we describe how many of each letter we have

$c + c + d + d + c + b = b + 3c + 2d$



perimeter = $a + a + b + b + b$
= $2a + 3b$

Maths, Y7 - Expressions



Perimeter = $x + x + y + y + 1 + 1 + 1 + 2 + 2$
= $2x + 2y + 7$

Notice the answer has a number in it.
We know that some of the perimeter adds up to 7.
The rest is described using x and y

3. Expanding single brackets

Multiply everything in the bracket by what is on the outside

$6(x + 2) = 6x + 12$

$x(x + 2) = x^2 + 2x$

$6x(x + 2) = 6x^2 + 12x$

4. Factorising single brackets

This is the reverse of expanding brackets.

Take the expressions and put the brackets back in.

Do this by finding the highest common factor of your terms

Factorise the expression.

$6x + 24$

$6x$ and 24 are both multiples of 6.

Therefore $6x + 24$ can be written as $6 \times (\text{something})$.

= $6(\quad)$

To find out what the unknown is you must divide $6x$ and 24 by 6.

$6x \div 6 = x$

$24 \div 6 = 4$

= $6(x + 4)$

5. Solving equations

This is where you work backwards to find the unknown number

$m - 3 = 10$
(+3) (+3)
 $m = 13$

$2x + 8 = 18$
(-8) (-8)
 $2x = 10$
($\div 2$) ($\div 2$)
 $x = 5$

$\frac{y}{4} = 10$
($\times 4$) ($\times 4$)
 $y = 40$