

What do I need to be able to do?

By the end of this unit you should be able to:

- Form Expressions
- Expand and factorise single brackets
- Form and solve equations
- Solve equations with brackets
- Represent inequalities
- Form and solve inequalities

Keywords

- Simplify:** grouping and combining similar terms
Substitute: replace a variable with a numerical value
Equivalent: something of equal value
Coefficient: a number used to multiply a variable
Product: multiply terms
Highest Common Factor (HCF): the biggest factor (or number that multiplies to give a term)
Inequality: an inequality compares two values showing if one is greater than, less than or equal to another

Form expressions

For unknown variables, a letter is normally used in its place

More than – ADD

Less than/ difference – SUBTRACT

eg 4 more than $t \rightarrow t + 4$
 8 less than $k \rightarrow k - 8$

Only similar terms can be grouped together

eg Find the perimeter of this shape
 (Perimeter = length around outside of shape)

$2t + 1 + t + 2t + 1 + t + 2t + 1 \rightarrow 6t + 2$

Directed numbers

$++ \rightarrow +$

$-- \rightarrow +$

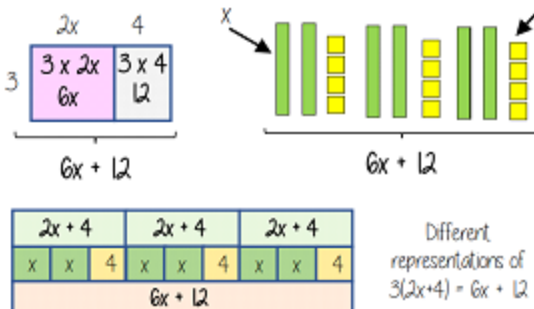
$+ - \rightarrow -$

$- + \rightarrow -$

eg $a = -5$ and $b = 2$
 $a^2 = a \times a = -5 \times -5 = 25$
 $b + a = 2 + -5 = -3$

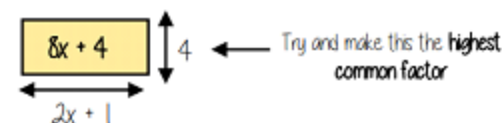
Multiply single brackets

$3(2x + 4)$



Factorise into a single bracket

$8x + 4$



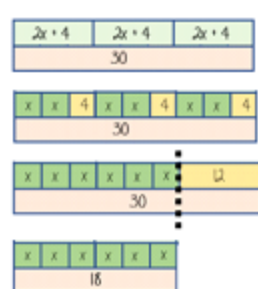
The two values multiply together (also the area) of the rectangle

$8x + 4 \equiv 4(2x + 1)$

Note:
 $8x + 4 \equiv 2(4x + 2)$
 This is factorised but the HCF has not been used

Solve equations with brackets

$3(2x + 4) = 30$



$3(2x + 4) = 30$

Expand the brackets

$6x + 12 = 30$

$-12 \quad -12$

$6x = 18$

$-6 \quad -6$

Substitute to check your answer
 This could be negative or a fraction or decimal

$\frac{x}{3} = 3 \quad x = 3$

Simple Inequalities

$<$ less than

\leq Less than or equal to

$>$ More than

\geq More than or equal to

$x < 10$

Say this out loud
 "x is a value less than 10"

$10 > x$

Say this out loud
 "10 is more than the value"

Note:
 $x < 10$ and $10 > x$
 represent the same values

$x + 2 \leq 20$

"my value + 2 is less than or equal to 20"

$x \leq 18$

The biggest the value can be is 18

Form and solve inequalities



Two more than treble my number is greater than 11

Find the possible range of values

Form

$x \rightarrow x \times 3 \rightarrow +2 \rightarrow 11$

$3x + 2 > 11$

Solve

$x \leftarrow -3 \leftarrow -2 \leftarrow 11$

$x > 3$

Check

This would suggest any value bigger than 3 satisfies the statement

$3 \times 3 + 2 = 11 \checkmark$

$10 \times 3 + 2 = 32 \checkmark$

Algebraic constructs

Expression

A sentence with a minimum of two numbers and one maths operation

Equation

A statement that two things are equal

Term

A single number or variable

Identity

An equation where both sides have variables that cause the same answer includes \equiv

Formula

A rule written with all mathematical symbols eg area of a rectangle $A = b \times h$