Y8 Brackets, Equations & Inequalities

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 multiples to give a term)
Inequality: an inequality compares who 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

e.g 4 more than t ⟶ t + 4
8 less than k ⟶ k - 8

Only similar terms can be grouped together

e.g Find the perimeter of this shape
(Perimeter = length around outside of shape)

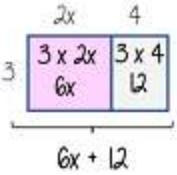
t + 2t + 1 + t + 2t + 1 ⟶ 6t + 2

Directed numbers

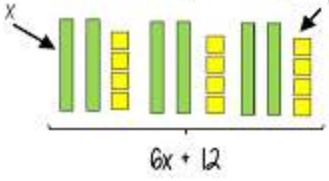
+ + ⟶ +
– – ⟶ +
+ – ⟶ –
– + ⟶ –

e.g 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)



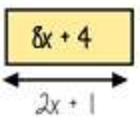
6x + 12



6x + 12

Different representations of 3(2x+4) = 6x + 12

Factorise into a single bracket 8x + 4



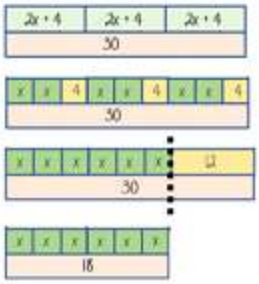
Try and make this the **highest common factor**

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

8x + 4 ≡ 4 (2x + 1)

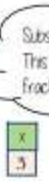
Note
8x + 4 ≡ 2(4x + 2)
This is factorised but the HCF has not been used

Solve equations with brackets 3 (2x + 4) = 30



3 (2x + 4) = 30
Expand the brackets
6x + 12 = 30
- 12 - 12
6x = 18
- 6 - 6
x = 3

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



x = 3

Simple Inequalities

< less than
≤ Less than or equal to
> More than
≥ More than or equal to

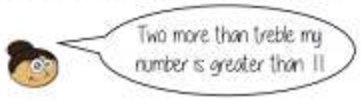
x < 10
Say this out loud
"x is a value less than 10"

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

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

x + 2 ≤ 20
"my value + 2 is less than or equal to 20"
x ≤ 18
The biggest the value can be is 18

Form and solve inequalities



Find the possible range of values

Form

x ⟶ x3 ⟶ +2 ⟶ 11

3x + 2 > 11

Solve

x ⟵ -3 ⟵ -2 ⟵ 11

x > 3

Check

This would suggest any value bigger than 3 satisfies the statement
3 x 3 + 2 = 11 ✓
10 x 3 + 2 = 32 ✓

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 ≡

Formula
A rule written with all mathematical symbols
e.g area of a rectangle A = b x h