

Simplifying terms

Collect 'like terms' means collecting the terms with the same letters together.

Eg. $2x + 3y + 4x - 5y + 3 = 6x - 2y + 3$

Be careful with negatives.

x^2 and x are not like terms.

Eg. $3x + 4 - x^2 + 2x - 1 = 5x - x^2 + 3$

Keywords

Expression = One or a group of terms. May include variables, constants, operators and grouping symbols. No '=' sign.

Equation = expressions of equal value connected by an equals symbol.

Expand linear brackets

To expand a bracket, multiply each term in the bracket by the expression outside the bracket.

Eg. $3(m + 7) = 3m + 21$

$2(3k - 2) = 6k - 4$

$x(x - 5) = x^2 - 5x$



Year 8 foundation topic 4 Expressions and equations

What careers would use these skills?

Maximising profit in business, engineers set up and solve equations, electricians rearrange formulae to calculate power, current and voltage.

Expanding double brackets

Multiply each term in the first bracket by the terms in the second bracket. Use either FOIL or the grid method.

Eg. Expand $(x+3)(x+2)$

(Multiply first, outside, inside, last for FOIL method)

$$= x^2 + 2x + 3x + 6$$

(Then simplify)

$$= x^2 + 5x + 6$$

Rearrange basic formulae

Use inverse operations on both sides of the formula (balancing method) until you find the expression for the letter.

Eg. Make x the subject of $y = \frac{2x-1}{z}$

Multiply both sides by z

$$yz = 2x - 1$$

Add 1 to both sides

$$yz + 1 = 2x$$

Divide by 2 on both sides

$$\frac{yz + 1}{2} = x$$

We now have x as the subject.

Solving one step equations

Use inverse operations on both sides of the equation (balancing method) until you find the value for the letter.

Eg. Solve $x + 2 = 5$

(Subtract 2 from both sides)

$$\text{So } x = 3$$

Solve two step equations

Eg. Solve $2x - 3 = 7$

(add 3 to both sides)

$$2x = 10$$

(divide by 2 on both sides)

$$\text{So } x = 5$$

Solve equations with brackets

Eg. Solve $5(x - 3) = 25$

(expand the bracket)

$$5x - 15 = 25$$

(add 15 to both sides)

$$5x = 10$$

(divide by 5)

$$x = 2$$

Solve equations with an unknown on both sides

Eg, Solve $3x + 5 = x + 11$

(take the x 's to the side with the most, remember to do the inverse operation)

$$2x + 5 = 11$$

(subtract 5 from both sides)

$$2x = 6$$

(divide by 2)

$$\text{So } x = 3$$