

Formulae

Essential information

Formula

This describes how one quantity is related to one or more other quantities.

For example,

$$y = x^2, \quad y = 2x + 1, \quad A = ab, \quad V = xyz, \quad F = \frac{9}{5}C + 32, \quad T = 2\pi\sqrt{\frac{l}{g}}$$

Substituting numbers into a formula

This means that letters are replaced by numbers in a formula.

For example,

$$F = \frac{9}{5}C + 32 \quad \text{when } C = 25$$

gives

$$\begin{aligned} F &= \frac{9}{5} \times 25 + 32 \\ &= 45 + 32 \\ &= 77 \end{aligned}$$

Changing the subject

This means rearranging a formula so that, for example,

$$y = f(x) \quad (\text{formula in } x)$$

is rearranged to give

$$x = g(y) \quad (\text{formula in } y)$$

For example,

$$F = \frac{9}{5}C + 32$$

can be rearranged to give

$$\begin{aligned} \frac{9}{5}C &= F - 32 \\ C &= \frac{5}{9}(F - 32) \end{aligned}$$

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Be careful with algebraic notation

Be careful when using algebraic notation. For example,

$$3 \times a = 3a$$

$$(3a)^2 = (3a) \times (3a) = (3 \times a) \times (3 \times a) = (3 \times 3) \times (a \times a) = 9 \times a^2 = 9a^2$$

When changing the subject of an equation, always write down clearly the operations which have been used. For example, make a the subject of the equation $4a + b = c$.

$$4a + b = c \quad (\text{add } -b \text{ to each side})$$

$$4a + b - b = c - b$$

$$4a = c - b \quad (\text{divide both sides by 4})$$

$$a = \frac{c - b}{4}$$

Note that

$$(-a) \times b = -a \times b \quad (= -ab) \quad \text{for any number } a, b$$

$$(-a) \times (-b) = a \times b \quad (= ab) \quad \text{for any number } a, b$$