

PROPORTION

When 2 quantities are related to each other

DIRECT PROPORTION

When one quantity varies directly to the other

i.e. The cost of petrol. The more you buy the more you pay. If 1 litre costs £1.18 2 litres cost £2.36

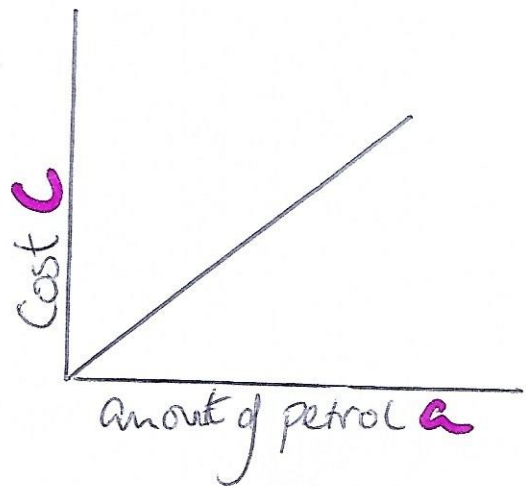
The cost C is directly proportional to the amount a

OR

C varies directly with a

can be written as

$$C \propto a$$



to create a formula you need a constant k

$$C = k a$$

k must be worked out from given values of C & a

Eg y varies proportionally to x

$$y = 10 \quad \text{when } x = 5$$

Start by creating a formula $y \propto x$

$$\Rightarrow y = kx$$

Now substitute y & x values into formula $10 = k \times 5$

Rearrange to find k

$$2 = k$$

Now put k 's value into formula $y = 2x$

This formula can now be used to find values of y & x

i.e. if $x = 40$ find y

$$y = 2 \times 40$$

$$y = 80$$

i.e. if $y = 18$ find x

$$18 = 2 \times x$$

$$9 = x$$

INVERSE PROPORTION

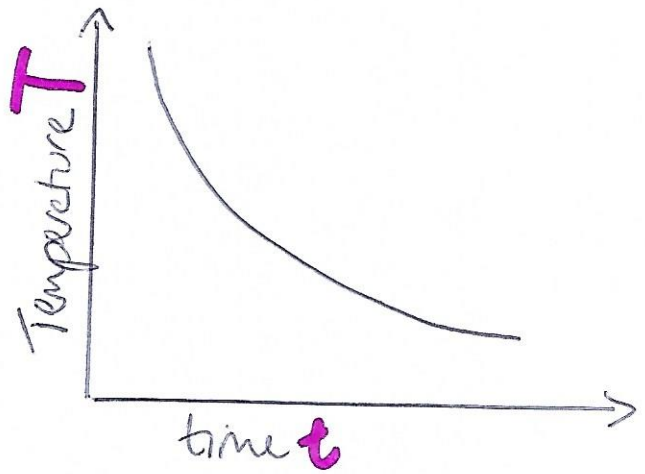
When one quantity varies inversely to the other
16/ The temperature of a hot drink decreases as time increases

T is inversely proportional to t

OR

T varies inversely to t

$$T \propto \frac{1}{t}$$



which can be written as

$$T = \frac{k}{t}$$

As with direct proportion k has to be found.

Eg y varies inversely to x

$$y = 10 \text{ when } x = 5$$

Start by creating a formula

Substitute values for y & x

Now put k into the formula

$$y \propto \frac{1}{x} \Rightarrow y = \frac{k}{x}$$
$$10 = \frac{k}{5} \quad k = 50$$
$$y = \frac{50}{x}$$

Using the formula find y when $x = 4$ $y = \frac{50}{4} \Rightarrow y = \underline{12.5}$

Eg 2 If a is inversely proportional to b^2 and $a = 50$ when $b = 2$

Find a , a when $b = 5$
 b , b when $a = 2$

First create formula & find k

$$a = \frac{k}{b^2} \Rightarrow 50 = \frac{k}{4} \quad k = 200$$

a, substitute $b = 5$ into formula

$$a = \frac{200}{b^2}$$
$$a = \frac{200}{25} \Rightarrow \underline{a = 8}$$

b, substitute $a = 2$ into formula

$$2 = \frac{200}{b^2} \quad b^2 = \frac{200}{2} \quad b = \sqrt{100}$$

$$\underline{b = 10}$$