

Worded Inverse Proportion Problems

The shutter speed, S , of a camera varies inversely as the size of the aperture setting, f . When $f = 8$, $S = 125$.

- (a) Find a formula for S in terms of f .
(b) Hence, or otherwise, calculate the value of S when $f = 4$.

$$S = \frac{k}{f}$$

$$125 = \frac{k}{8}$$

$$k = 1000$$

$$(a) S = \frac{1000}{f}$$

$$(b) S = \frac{1000}{4}$$

$$S = 250$$

The pressure of water from a hose is inversely proportional to the hose radius. For a hose of radius 2 cm, the water pressure is 40 Pa. What hose radius do you need for a pressure of 50 Pa?

$$P = \frac{k}{r}$$

$$40 = \frac{k}{2}$$

$$k = 80$$

$$P = \frac{80}{r}$$

$$50 = \frac{80}{r}$$

$$r = 1.6 \text{ cm}$$

The amount of diesel a van uses is inversely proportional to the number of miles it travels. When a van travels 320 miles, it uses 36 litres of diesel. How much diesel will it need to travel 200 miles?

$$D = \frac{k}{m}$$

$$36 = \frac{k}{320}$$

$$k = 11520$$

$$D = \frac{11520}{m}$$

$$D = 57.6 \text{ litres}$$

In a science experiment, p is found to be inversely proportional to t . When $p = 42.8$, $t = 0.8$. Find t when $p = 23.6$. Give your answer to 2 decimal places.

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

$$42.8 = \frac{k}{0.8}$$

$$k = 34.24$$

$$p = \frac{34.24}{t}$$

$$t = 1.45 \text{ (2dp)}$$

The light intensity I on a surface is inversely proportional to the square of the distance x from the light source. When the surface is 6 cm from the light source, the intensity is 2400.

- (a) Find the light intensity when the surface is 15 cm from the light source.
(b) If the light intensity is 600, how far is the surface from the light source?

$$I = \frac{k}{x^2}$$

$$2400 = \frac{k}{36}$$

$$k = 86400$$

$$(a) I = \frac{86400}{15^2}$$

$$I = 384$$

$$(b) 600 = \frac{86400}{x^2}$$

$$x = 12 \text{ cm}$$