

Direct and Inverse Proportion

Question Paper

Level	GCSE
Subject	Maths
Exam Board	Edexcel GCSE
Topic	Direct and Inverse Proportion
Grade Level	Grade 7
Booklet	Question Paper

Time Allowed: 90 minutes

Score: /75

Percentage: /100

Grade Boundaries:

1. The weight of a piece of wire is directly proportional to its length.

A piece of wire is 25 cm long and has a weight of 6 grams.
Another piece of the same wire is 30 cm long.

Calculate the weight of the 30 cm piece of wire.

..... grams
(Total 2 marks)

2. A ball falls vertically after being dropped.
The ball falls a distance d metres in a time of t seconds.
 d is directly proportional to the square of t .

The ball falls 20 metres in a time of 2 seconds.

(a) Find a formula for d in terms of t .

$d = \dots\dots\dots$ (3)

(b) Calculate the distance the ball falls in 3 seconds.

..... m (1)

(c) Calculate the time the ball takes to fall 605 m.

..... seconds (3)
(Total 7 marks)

3. The time, T seconds, it takes a water heater to boil some water is directly proportional to the mass of water, m kg, in the water heater.

When $m = 250$, $T = 600$

- (a) Find T when $m = 400$

$$T = \dots\dots\dots \quad (3)$$

The time, T seconds, it takes a water heater to boil a constant mass of water is inversely proportional to the power, P watts, of the water heater.

When $P = 1400$, $T = 360$

- (b) Find the value of T when $P = 900$

$$T = \dots\dots\dots \quad (3)$$

(Total 6 marks)

4. D is proportional to S^2 .

$D = 900$ when $S = 20$

Calculate the value of D when $S = 25$

$$D = \dots\dots\dots \quad (Total\ 4\ marks)$$

5. In a spring, the tension (T newtons) is directly proportional to its extension (x cm).

When the tension is 150 newtons, the extension is 6 cm.

(a) Find a formula for T in terms of x .

$$T = \dots\dots\dots \quad (3)$$

(b) Calculate the tension, in newtons, when the extension is 15 cm.

$$\dots\dots\dots \text{ newtons} \quad (1)$$

(c) Calculate the extension, in cm, when the tension is 600 newtons.

$$\dots\dots\dots \text{ cm} \quad (1)$$

(Total 5 marks)

6. d is directly proportional to the square of t .

$d = 80$ when $t = 4$

(a) Express d in terms of t .

..... (3)

(b) Work out the value of d when $t = 7$

$d =$ (1)

(c) Work out the positive value of t when $d = 45$

$t =$ (2)

(Total 6 marks)

7. The distance, D , travelled by a particle is directly proportional to the square of the time, t , taken.

When $t = 40$, $D = 30$

- (a) Find a formula for D in terms of t .

$$D = \dots\dots\dots$$

- (b) Calculate the value of D when $t = 64$

.....

(1)

- (c) Calculate the value of t when $D = 12$
Give your answer correct to 3 significant figures.

.....

(2)

(Total 6 marks)

8. M is directly proportional to L^3 .

When $L = 2$, $M = 160$

Find the value of M when $L = 3$

.....

(Total 4 marks)

9. p is inversely proportional to m .

$p = 48$ when $m = 9$

Calculate the value of p when $m = 12$

.....

(Total 2 marks)

10. r is inversely proportional to t .
 $r = 12$ when $t = 0.2$

Calculate the value of r when $t = 4$.

.....
(Total 3 marks)

11. f is inversely proportional to d .

When $d = 50$, $f = 256$

Find the value of f when $d = 80$

$f =$
(Total 3 marks)

12. y is inversely proportional to x^2 .

Given that $y = 2.5$ when $x = 24$,

(i) find an expression for y in terms of x

$y = \dots\dots\dots$

(ii) find the value of y when $x = 20$

$y = \dots\dots\dots$

(iii) find a value of x when $y = 1.6$

$x = \dots\dots\dots$

(Total 6 marks)

13. P is inversely proportional to d^2 .

$P = 10\,000$ when $d = 0.4$

Find the value of P when $d = 0.8$

$P = \dots\dots\dots$

(Total 3 marks)

14. The shutter speed, S , of a camera varies inversely as the square of the aperture setting, f .

When $f = 8$, $S = 125$

(a) Find a formula for S in terms of f .

.....

(3)

(b) Hence, or otherwise, calculate the value of S when $f = 4$

$S =$

(1)

(Total 4 marks)

15. q is inversely proportional to the square of t .

When $t = 4$, $q = 8.5$

(a) Find a formula for q in terms of t .

$q = \dots\dots\dots$

(3)

(b) Calculate the value of q when $t = 5$

$\dots\dots\dots$

(1)

(Total 4 marks)

16. P is inversely proportional to V .

When $V = 8$, $P = 5$

(a) Find a formula for P in terms of V .

$P = \dots\dots\dots$
(3)

(b) Calculate the value of P when $V = 2$

$\dots\dots\dots$
(1)

(Total 4 marks)

17. The force, F , between two magnets is inversely proportional to the square of the distance, x , between them.

When $x = 3$, $F = 4$.

(a) Calculate F when $x = 2$.

$\dots\dots\dots$
(4)

(b) Calculate x when $F = 64$.

$\dots\dots\dots$
(2)

(Total 6 marks)