

Direct and Inverse Proportion

Exercise A

1. Rewrite the statement connecting each pair of variables using a constant k instead of ' \propto '.

- (a) $S \propto e$ (b) $v \propto t$ (c) $x \propto z^2$
 (d) $y \propto \sqrt{x}$ (e) $T \propto \sqrt{L}$

2. y varies as t . If $y = 6$ when $t = 4$, calculate:

- (a) the value of y , when $t = 6$
 (b) the value of t , when $y = 4$.

3. z is proportional to m . If $z = 20$ when $m = 4$, calculate:

- (a) the value of z , when $m = 7$
 (b) the value of m , when $z = 55$.

4. A varies directly as r^2 . If $A = 12$, when $r = 2$, calculate:

- (a) the value of A , when $r = 5$
 (b) the value of r , when $A = 48$.

5. Given that $z \propto x$, copy and complete the table.

x	1	3		$5\frac{1}{2}$
z	4		16	

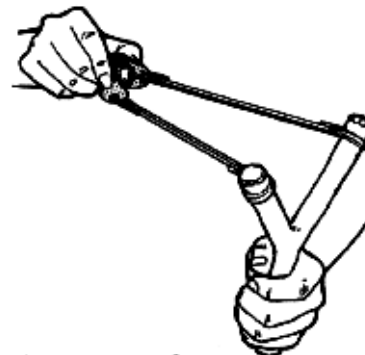
6. Given that $V \propto r^3$, copy and complete the table.

r	1	2		$1\frac{1}{2}$
V	4		256	

7. The pressure of the water P at any point below the surface of the sea varies as the depth of the point below the surface d . If the pressure is 200 newtons/cm² at a depth of 3 m, calculate the pressure at a depth of 5 m.

8. The distance d through which a stone falls from rest is proportional to the square of the time taken t . If the stone falls 45 m in 3 seconds, how far will it fall in 6 seconds?
 How long will it take to fall 20 m?

9. The energy E stored in an elastic band is proportional to the square of the extension x .
 When the elastic is extended by 3 cm, the energy stored is 243 joules. What is the energy stored when the extension is 5 cm?
 What is the extension when the stored energy is 36 joules?



10. The resistance to motion of a car is proportional to the square of the speed of the car. If the resistance is 4000 newtons at a speed of 20 m/s, what is the resistance at a speed of 30 m/s?
 At what speed is the resistance 6250 newtons?

11. In an experiment, measurements of w and p were taken.

w	2	5	7
p	1.6	25	68.6

Which of these laws fits the results?

$p \propto w$, $p \propto w^2$, $p \propto w^3$.

Exercise B

1. Rewrite the statements connecting the variables using a constant of variation, k .

(a) $x \propto \frac{1}{y}$ (b) $s \propto \frac{1}{t^2}$ (c) $t \propto \frac{1}{\sqrt{q}}$

(d) m varies inversely as w

(e) z is inversely proportional to t^2 .

2. T is inversely proportional to m . If $T = 12$ when $m = 1$, find:

(a) T when $m = 2$ (b) T when $m = 24$.

3. L is inversely proportional to x . If $L = 24$ when $x = 2$, find:

(a) L when $x = 8$ (b) L when $x = 32$.

4. b varies inversely as e . If $b = 6$ when $e = 2$, calculate:

(a) the value of b when $e = 12$

(b) the value of e when $b = 3$.

5. x is inversely proportional to y^2 . If $x = 4$ when $y = 3$, calculate:

(a) the value of x when $y = 1$

(b) the value of y when $x = 2\frac{1}{4}$.

6. p is inversely proportional to \sqrt{y} . If $p = 1.2$ when $y = 100$, calculate:

(a) the value of p when $y = 4$

(b) the value of y when $p = 3$.

7. Given that $z \propto \frac{1}{y}$, copy and complete the table:

y	2	4		$\frac{1}{4}$
z	8		16	

8. Given that $v \propto \frac{1}{t^2}$, copy and complete the table:

t	2	5		10
v	25		$\frac{1}{4}$	

Exercise C

1.

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 $V = 2$

$$\dots\dots\dots (1)$$

2.

y is directly proportional to x .

When $x = 500$, $y = 10$

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

$$y = \dots\dots\dots (3)$$

(b) Calculate the value of y when $x = 350$

$$y = \dots\dots\dots$$

(1)

3.

D is proportional to S^2 .

$D = 900$ when $S = 20$

Calculate the value of D when $S = 25$

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

4.

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 $t = 5$

.....
(1)

