

1 Direct proportion

7 notebooks cost £9.45.

- a) Find the cost of 12 of the notebooks.
b) A pack of 15 of the same notebooks costs £19.50.
Is the pack better value? Show why.

a) $9.45 \div 7 = \pounds 1.35, \times 12 = \pounds 16.20$

b) $19.50 \div 15 = \pounds 1.30$ each, less than £1.35,
so yes

2 Inverse proportion

5 printers take 36 minutes to print a batch of leaflets.
The printers all work at the same rate.

- a) How long would 3 printers take?
b) The batch must be printed in 25 minutes.
How many printers are needed?

$5 \times 36 = 180$ printer minutes

a) $180 \div 3 = 60$ minutes

b) $180 \div 25 = 7.2$, so 8 printers

3 Proportion equations

One table shows direct proportion and one shows inverse proportion.

- a) Which is which? Show how you know.
b) Write an equation for y in terms of x for each table.

P

x	2	5	8	10
y	30	12	7.5	6

Q

x	2	5	8	10
y	7	17.5	28	35

a) P: $xy = 60$, inverse; Q: $y \div x = 3.5$, direct

b) P: $y = \frac{60}{x}$ Q: $y = 3.5x$

4 Direct proportion: $y = kx$

y is directly proportional to the cube of x .
When $x = 3, y = 54$.

- a) Find a formula for y in terms of x .
b) Find x when $y = 250$.

a) $54 = k \times 27, k = 2, y = 2x^3$

b) $x^3 = 250 \div 2 = 125, x = 5$

Proportion 2

revision mat answers

Higher A

5 Proportion: worded problems

The cost, £ C , of a round rug is directly proportional to the square of its diameter, d metres. A rug with diameter 1.2 m costs £86.40.

- a) Find a formula for C in terms of d .
b) A rug costs £150. Find its diameter.

a) $86.4 = k \times 1.44, C = 60d^2$

b) $d^2 = 150 \div 60 = 2.5, d = 1.58$ m

6 Inverse proportion: $y = \frac{k}{x}$

y is inversely proportional to the square root of x .
When $x = 16, y = 6$.

- a) Find y when $x = 25$.
b) x is multiplied by 9. What happens to y ?

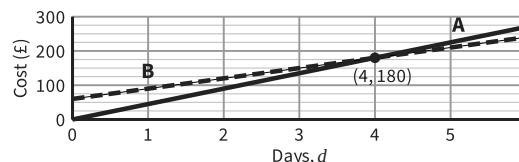
a) $k = 6 \times \sqrt{16} = 24, y = \frac{24}{\sqrt{25}} = 4.8$

b) $\sqrt{x}$ is multiplied by 3, so y is divided by 3

7 Direct proportion graphs

The cost of hiring a van for d days from two firms.

- a) Which firm's cost is directly proportional to d ? Why?
b) Write a formula for that firm's cost, £ C .



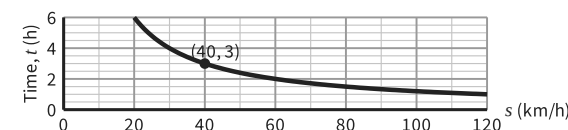
a) A: a straight line through $(0, 0)$

b) $180 \div 4 = 45, C = 45d$

8 Inverse proportion graphs

A journey takes t hours at an average speed of s km/h.

- a) Use the graph to find a formula for t in terms of s .
b) Find the time at 96 km/h in hours and minutes.



a) $40 \times 3 = 120, t = \frac{120}{s}$

b) $120 \div 96 = 1.25$ h = 1 h 15 min