

Direct/Indirect Proportion Worksheet

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Topic tags have been given for each question to enable you to know if you can do the question or whether you need to wait to cover the additional topic(s).

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13 p is inversely proportional to t

Complete the table of values.

t	100	25		2
p	1		5	

(Total for Question 13 is 3 marks)

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4 It would take 120 minutes to fill a swimming pool using water from 5 taps.

(a) How many minutes will it take to fill the pool if only 3 of the taps are used?

..... minutes
(2)

(b) State one assumption you made in working out your answer to part (a).

.....
.....
(1)

(Total for Question 4 is 3 marks)

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- 6 At a depth of x metres, the temperature of the water in an ocean is $T^{\circ}\text{C}$.
At depths below 900 metres, T is inversely proportional to x .

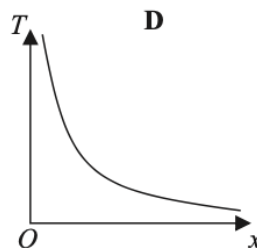
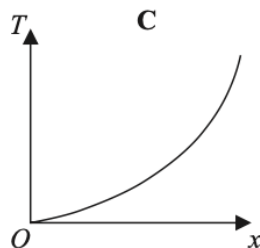
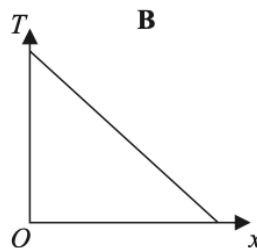
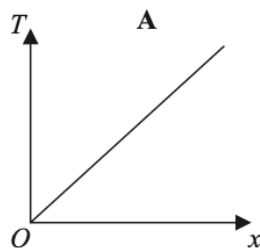
T is given by

$$T = \frac{4500}{x}$$

- (a) Work out the difference in the temperature of the water at a depth of 1200 metres and the temperature of the water at a depth of 2500 metres.

..... $^{\circ}\text{C}$
(3)

Here are four graphs.



One of the graphs could show that T is inversely proportional to x .

- (b) Write down the letter of this graph.

.....
(1)

(Total for Question 6 is 4 marks)

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16 y is directly proportional to $\sqrt[3]{x}$

$$y = 1\frac{1}{6} \text{ when } x = 8$$

Find the value of y when $x = 64$

(Total for Question 16 is 3 marks)

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14 F is inversely proportional to the square of v .

Given that $F = 6.5$ when $v = 4$

find a formula for F in terms of v .

(Total for Question 14 is 3 marks)

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15 A is inversely proportional to C^2

$$A = 40 \text{ when } C = 1.5$$

Calculate the value of C when $A = 1000$

$$C = \dots\dots\dots$$

(Total for Question 15 is 3 marks)

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20 T is inversely proportional to m^2

$$T = 30 \text{ when } m = 0.5$$

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

.....
(3)

(b) Work out the value of T when $m = 0.1$

.....
(1)

.....
(Total for Question 20 is 4 marks)

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16 A is inversely proportional to the square of r

$$A = 5 \text{ when } r = 0.3$$

(a) Find a formula for A in terms of r

.....
(3)

(b) Find the value of A when $r = 7.5A$

$A =$
(3)

(Total for Question 16 is 6 marks)

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15 P is inversely proportional to \sqrt{q}

$$P = 10 \text{ when } q = 0.0064$$

(a) Find a formula for P in terms of q

.....
(3)

(b) Find the value of q when $P = 20$

.....
(2)

.....
(Total for Question 15 is 5 marks)

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16 M is inversely proportional to g^3

$M = 24$ when $g = 2.5$

(a) Find a formula for M in terms of g

.....
(3)

(b) Work out the value of g when $M = \frac{1}{9}$

$g =$
(2)

(Total for Question 16 is 5 marks)

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13 y is directly proportional to x .

$$y = 24 \text{ when } x = 1.5$$

Work out the value of y when $x = 5$

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

(Total for Question 13 is 3 marks)

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- 16** The following table gives values of x and y where y is inversely proportional to the square of x .

x	1.5	2	3	4
y	16	9	4	2.25

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

.....
(3)

Given that $x > 0$

- (b) find the value of x when $y = 144$

.....
(2)

.....
(Total for Question 16 is 5 marks)

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13 The table shows a set of values for x and y .

x	1	2	3	4
y	9	$2\frac{1}{4}$	1	$\frac{9}{16}$

y is inversely proportional to the square of x .

(a) Find an equation for y in terms of x .

.....
(2)

(b) Find the positive value of x when $y = 16$

.....
(2)

.....
(Total for Question 13 is 4 marks)

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- 9 On Monday, 12 people took 5 hours to clean a number of cars.
On Tuesday, 15 people cleaned the same number of cars.

Assuming that all the people worked at the same rate,

- (a) work out how many hours the 15 people took to clean the cars.

..... hours
(2)

The assumption is wrong.

- (b) How might this affect the time taken for the 15 people to clean the cars?

.....
.....
.....
(1)

(Total for Question 9 is 3 marks)

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16 Shirley wants to find an estimate for the number of bees in her hive.

On Monday she catches 90 of the bees.

She puts a mark on each bee and returns them to her hive.

On Tuesday she catches 120 of the bees.

She finds that 20 of these bees have been marked.

(a) Work out an estimate for the total number of bees in her hive.

.....
(3)

Shirley assumes that none of the marks had rubbed off between Monday and Tuesday.

(b) If Shirley's assumption is wrong, explain what effect this would have on your answer to part (a).

.....
(1)

.....
(Total for Question 16 is 4 marks)

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- 14** Saffron wants to work out an estimate for the total number of fish in a lake.

On Friday, Saffron catches 180 fish from the lake.

She puts a tag on each of these fish and puts them back into the lake.

On Saturday, Saffron catches 305 fish from the same lake.

She finds that 45 of the 305 fish are tagged.

Work out an estimate for the total number of fish in the lake.

.....
(Total for Question 14 is 3 marks)

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7 There are 1200 students at a school.

Kate is helping to organise a party.
She is going to order pizza.

Kate takes a sample of 60 of the students at the school.
She asks each student to tell her **one** type of pizza they want.

The table shows information about her results.

Pizza	Number of students
ham	20
salami	15
vegetarian	8
margarita	17

Work out how much ham pizza Kate should order.

Write down any assumption you make **and** explain how this could affect your answer.

(Total for Question 7 is 3 marks)

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- 15** A pendulum of length L cm has time period T seconds.
 T is directly proportional to the square root of L .

The length of the pendulum is increased by 40%.

Work out the percentage increase in the time period.

..... %

(Total for Question 15 is 3 marks)

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9 A company has to make a large number of boxes.

The company has 6 machines.

All the machines work at the same rate.

When all the machines are working, they can make all the boxes in 9 days.

The table gives the number of machines working each day.

	day 1	day 2	day 3	all other days
Number of machines working	3	4	5	6

Work out the total number of days taken to make all the boxes.

.....

(Total for Question 9 is 3 marks)

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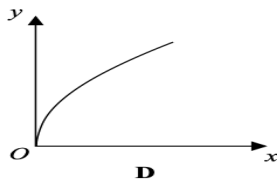
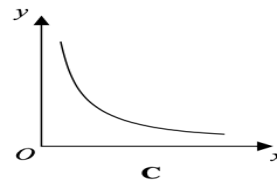
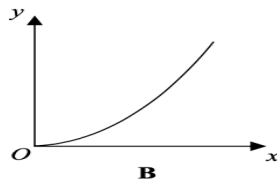
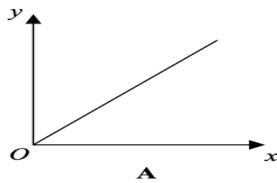
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11 Here are four graphs.



- (a) Write down the letter of the graph that could represent
 y is proportional to x^2

(1)

- (b) The force of attraction, F newtons, between two magnets varies inversely as the square of the distance, d cm, between the two magnets.
- (i) What happens to the force of attraction between the magnets when the distance between the magnets is doubled?

When the magnets are 3 cm apart the force of attraction between them is 40 newtons.

- (ii) What is the force of attraction between the magnets when they are 10 cm apart?

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(5)
 (Total for Question 11 is 6 marks)

14 y is inversely proportional to d^2

When $d = 10$, $y = 4$

d is directly proportional to x^2

When $x = 2$, $d = 24$

Find a formula for y in terms of x .

Give your answer in its simplest form.

.....
(Total for Question 14 is 5 marks)

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- 13** A factory makes 450 pies every day.
The pies are chicken pies or steak pies.

Each day Milo takes a sample of 15 pies to check.

The proportion of the pies in his sample that are chicken is the same as the proportion of the pies made that day that are chicken.

On Monday Milo calculated that he needed exactly 4 chicken pies in his sample.

- (a) Work out the total number of chicken pies that were made on Monday.

.....
(2)

On Tuesday, the number of steak pies Milo needs in his sample is 6 correct to the nearest whole number.

Milo takes at random a pie from the 450 pies made on Tuesday.

- (b) Work out the lower bound of the probability that the pie is a steak pie.

.....
(2)

.....
(Total for Question 13 is 4 marks)

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- 17** x is directly proportional to the square of y .
 y is directly proportional to the cube of z .

$$z = 2 \text{ when } x = 32$$

Find a formula for x in terms of z .

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(Total for Question 17 is 4 marks)

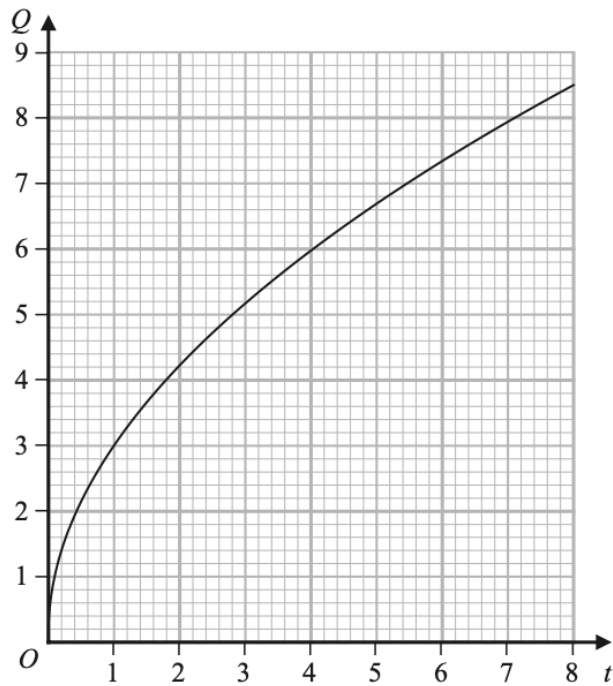
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16 Q is directly proportional to \sqrt{t}
The graph shows the relationship between Q and t for $0 < t < 8$



(a) Find a formula for Q in terms of t

.....
(3)

Q is increased by 20%

(b) Find the percentage increase in t

..... %
(2)

(Total for Question 16 is 5 marks)



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