

# Direct & Inverse Proportion

## Question Paper

Course	Edexcel IGCSE Maths
Section	1. Numbers & the Number System
Topic	Direct & Inverse Proportion
Difficulty	Hard

**Time allowed:** 90  
**Score:** /67  
**Percentage:** /100

### Question 1

$y$  is directly proportional to the square of  $x$ .

When  $x = 3$ ,  $y = 36$

Find the value of  $y$  when  $x = 5$

[4 marks]

### Question 2

$h$  is inversely proportional to the square of  $r$ .

When  $r = 5$ ,  $h = 3.4$

Find the value of  $h$  when  $r = 8$

[3 marks]

### Question 3

Given that  $y \propto \frac{1}{x^2}$ , complete this table of values.

$x$	1	2	5	10
$y$				1

[4 marks]

#### Question 4

The intensity of the sound,  $I$  watts/m<sup>2</sup>, received from a loudspeaker is inversely proportional to the square of the distance,  $d$  metres, from the loudspeaker.

When  $d = 2$ ,  $I = 30$

Work out the value of  $I$  when  $d = 10$

[3 marks]

#### Question 5

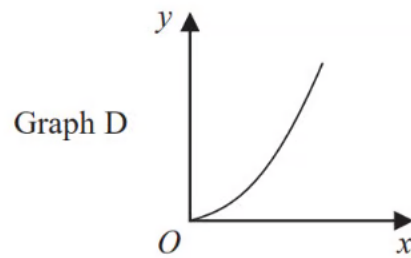
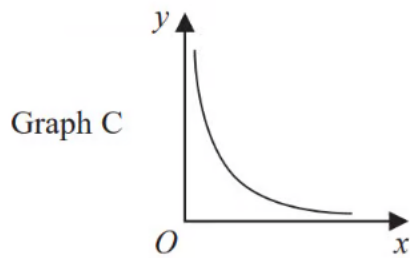
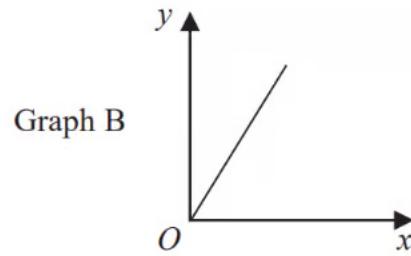
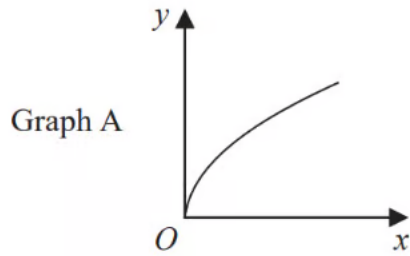
$T$  is inversely proportional to  $d^2$

$T = 12$  when  $d = 8$

Find the value of  $T$  when  $d = 0.5$

[3 marks]

**Question 6**



The graphs of  $y$  against  $x$  represent four different types of proportionality.

Match each type of proportionality in the table to the correct graph.

Type of proportionality	Graph letter
$y \propto x$	
$y \propto x^2$	
$y \propto \sqrt{x}$	
$y \propto \frac{1}{x}$	

[2 marks]

**Question 7**

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
<b>Number of machines working</b>	3	4	5	6

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

**[3 marks]**

**Question 8**

$A$  is inversely proportional to  $C^2$

$A = 40$  when  $C = 1.5$

Calculate the value of  $C$  when  $A = 1000$

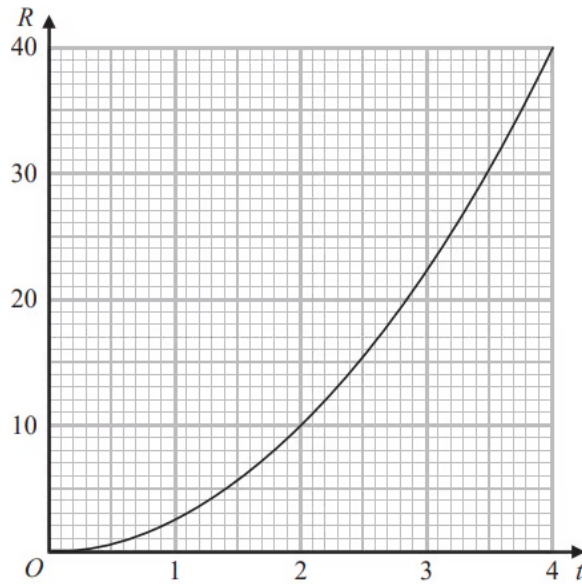
$C = \dots\dots\dots$

**[3 marks]**

**Question 9a**

$R$  is proportional to  $t^2$

The graph shows the relationship between  $R$  and  $t$  for  $0 \leq t \leq 4$



Find a formula for  $R$  in terms of  $t$ .

[3 marks]

**Question 9b**

Given also that  $R = \frac{8}{5x}$

show that  $t$  is inversely proportional to  $\sqrt{x}$  for  $t > 0$

[2 marks]

**Question 10**

$F$  is inversely proportional to the square of  $v$ .

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

find a formula for  $F$  in terms of  $v$ .

[3 marks]

**Question 11a**

$T$  is inversely proportional to  $m^2$

$T = 30$  when  $m = 0.5$

Find a formula for  $T$  in terms of  $m$ .

[3 marks]

**Question 11b**

Work out the value of  $T$  when  $m = 0.1$

[1 mark]

### Question 12a

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

Find a formula for  $y$  in terms of  $x$ .

[3 marks]

### Question 12b

Given that  $x > 0$

find the value of  $x$  when  $y = 144$

[2 marks]

### Question 13a

$P$  is inversely proportional to  $\sqrt{q}$

$P = 10$  when  $q = 0.0064$

Find a formula for  $P$  in terms of  $q$ .

[3 marks]



**Question 13b**

Find the value of  $q$  when  $P=20$

[2 marks]

**Question 14a**

$y$  is inversely proportional to  $\sqrt{x}$

$$y = 4 \text{ when } x = 9$$

Work out an equation connecting  $y$  and  $x$ .

[3 marks]

**Question 14b**

Work out the value of  $y$  when  $x = 25$

[2 marks]

**Question 15**

15 machines work at the same rate.

Together, the 15 machines can complete an order in 8 hours.

3 of the machines break down after working for 6 hours.

The other machines carry on working until the order is complete.

In total, how many hours does **each** of the other machines work?

.....hours

**[3 marks]**

**Question 16**

$V = \frac{k}{H}$  where  $k$  is a constant.

Which **two** statements are correct?

Tick **two** boxes.

- $V$  is directly proportional to  $H$
- $V$  is inversely proportional to  $H$
- $V$  is directly proportional to  $\frac{1}{H}$
- $V$  is inversely proportional to  $\frac{1}{H}$

**[1 mark]**

**Question 17**

$xy = c$  where  $c$  is a constant.

Circle the correct statement.

$y$  is directly proportional to  $x$

$y$  is directly proportional to  $\frac{1}{x}$

$y$  is inversely proportional to  $\frac{1}{x}$

$x$  is directly proportional to  $y$

[1 mark]

**Question 18**

Three people take  $2\frac{1}{2}$  hours to deliver leaflets to 270 houses.

Assuming all people deliver leaflets at the same rate, how long will it take five people to deliver leaflets to 405 houses?

Give your answer in hours and minutes.

..... hours ..... minutes

[4 marks]

**Question 19**

$y$  is inversely proportional to the square root of  $x$ .

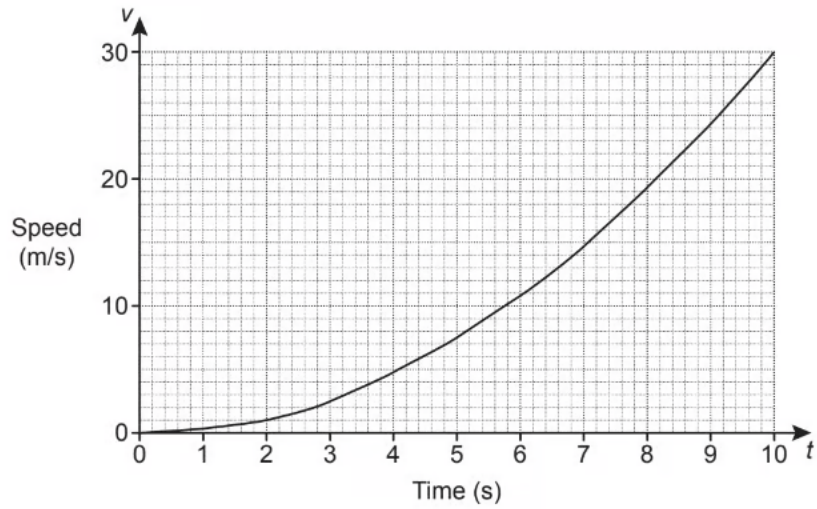
$y$  is 40 when  $x$  is 9.

Find a formula linking  $x$  and  $y$ .

[3 marks]

### Question 20

The graph shows the speed,  $v$  metres per second (m/s), of a car at time  $t$  seconds.



The speed of this car is directly proportional to the square of the time.

Find a formula linking  $v$  and  $t$ .

[3 marks]