# Direct & Inverse Proportion

## Question Paper

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

**Time allowed:** 80

**Score:** /62

**Percentage:** /100

## Question 1a

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 $x$.

Find an equation for $y$ in terms of $x$.

[2 marks]

## Question 1b

Find the positive value of $x$ when $y = 16$

[2 marks]

## Question 2

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

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

Find the value of $y$ when $x = 64$

[3 marks]

## Question 3

$y$ 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.

**[5 marks]**

## Question 4

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.

**[3 marks]**

## Question 5

$D$ is directly proportional to the cube of $n$.

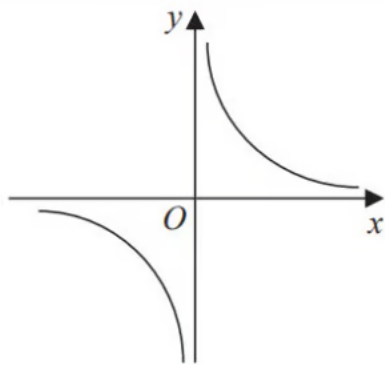Mary says that when $n$ is doubled, the value of $D$ is multiplied by 6
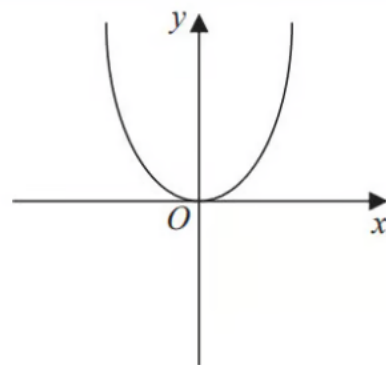
Mary is wrong.
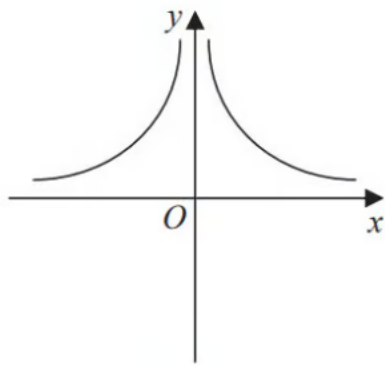
Explain why.

**[1 mark]**

## Question 6

These graphs show four different proportionality relationships between $y$ and $x$.
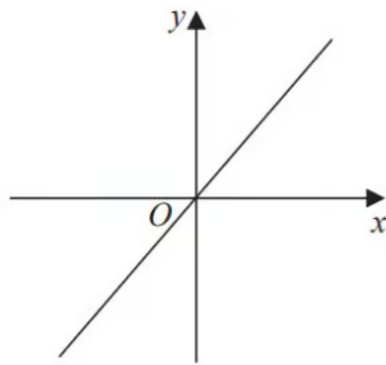


**Graph A**



**Graph B**



**Graph C**



**Graph D**

Match each graph with a statement in the table below.

| Proportionality relationship | Graph letter |
|---|---|
| $y$ is directly proportional to $x$ | |
| $y$ is inversely proportional to $x$ | |
| $y$ is proportional to the square of $x$ | |
| $y$ is inversely proportional to the square of $x$ | |

[2 marks]

**Question 7**

$h$ is inversely proportional to $p$

$p$ is directly proportional to $\sqrt{t}$

Given that $h = 10$ and $t = 144$ when $p = 6$
find a formula for $h$ in terms of $t$

**[4 marks]**

**Question 8**

$y$ is inversely proportional to $\sqrt{x}$
$x$ is directly proportional to $T^3$

Given that $y = 8$ when $T = 25$
find the exact value of $T$ when $y = 27$

$T = $ .....................................................

**[4 marks]**

## Question 9a

$y$ is directly proportional to the cube of $x$

$y = 20\,h$ when $x = h \quad (h \neq 0)$

Find a formula for $y$ in terms of $x$ and $h$

$y$ = ......................

**[3 marks]**

## Question 9b

Find $x$ in terms of $h$ when $y = 67.5\,h$
Give your answer in its simplest form.

$x$ =........................

**[2 marks]**

## Question 10a

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

$A = 5$ when $r = 0.3$.

Find a formula for $A$ in terms of $r$.

**[3 marks]**

## Question 10b

Find the value of $A$ when $r = 7.5A$

$A =$ ..............................................

**[3 marks]**

## Question 11

Beth and Mia translate documents from Spanish into English.
A set of documents that would take Beth 8 days would take Mia 10 days.

Beth starts to translate the documents.
After 2 days Beth and Mia both work on translating the documents.

How many **more** days will it take to complete the work?
You **must** show your working.

.......................days

**[4 marks]**

## Question 12a

$y$ is directly proportional to $x^3$

$y = 17$ when $x = 4$

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

[3 marks]

## Question 12b

$m$ is inversely proportional to $\sqrt{r}$.

The value of $r$ is multiplied by 4.

Circle what happens to the value of $m$.

$\times 2$ $\times 16$ $\div 2$ $\div 16$

[1 mark]

## Question 13

$P$, $Q$ and $R$ have positive values.

$P$ is directly proportional to the square of $Q$.
When $P = 1.25$, $Q = 0.5$
$Q$ is inversely proportional to $R$.
When $Q = 0.5$, $R = 6$

Work out the value of $R$ when $P = 0.8$

[5 marks]

**Question 14**

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

Find the percentage increase in *y* when *x* is increased by 15%.

**[4 marks]**

**Question 15**

At a constant temperature, the volume of a gas V is inversely proportional to its pressure *p*.
By what percentage will the pressure of a gas change if its volume increases by 25%?

**[4 marks]**

## Question 16

*x* is directly proportional to *y*.
*y* is directly proportional to *z*.

When $x = 10$, $y = 60$.
When $y = 8$, $z = 1.6$.

Find a formula for *z* in terms of *x*.

**[4 marks]**