



EXAM PAPERS PRACTICE

GCSE OCR Math J560

Direct & Inverse Proportion

Answers

*"We will help you to
achieve A Star "*



Answer 1

p is inversely proportional to t .

When $t = 4, p = 12$

Find the value of p when $t = 6$

Find k

$$k = p \times t$$

$$k = 12 \times 4$$
$$= \underline{\underline{48}}$$

$$p = \frac{48}{t}$$

When $t = 6$:

$$p = \frac{48}{6} = \underline{\underline{8}}$$



PROPORTIONALITY

FIND FORMULA FOR A IN TERMS OF B

FIRST:

DIRECT: $A = kB$

INVERSE: $A = \frac{k}{B}$

(FIND k !)



Answer 2

A

d is inversely proportional to c

When $c = 280$, $d = 25$

Find the value of d when $c = 350$

B

Find k .

$$k = d \times c$$

$$\left. \begin{array}{l} c = 280 \\ d = 25 \end{array} \right\} \begin{array}{l} k = 25 \times 280 \\ = 7000 \end{array}$$

So formula is

$$d = \frac{7000}{c}$$

$$c = 350: \quad d = \frac{7000}{350}$$

$$d = \underline{\underline{20}}$$

PROPORTIONALITY

FIND FORMULA FOR
A IN TERMS OF B

FIRST:

DIRECT: $A = kB$

INVERSE: $A = \frac{k}{B}$

(FIND k !)





Answer 3

y is inversely proportional to x
When $x = 1.5, y = 36$

Find the value of y when $x = 6$

$$y = \frac{k}{x}$$

$$1.5 \times 36 = \frac{k}{1.5}$$

$$k = 54$$

So $y = \frac{54}{x}$

$x = 6:$ $y = \frac{54}{6}$

$$y = 9$$

PROPORTIONALITY

FIND FORMULA FOR
A IN TERMS OF B

FIRST:

DIRECT: $A = kB$

INVERSE: $A = \frac{k}{B}$

(FIND k !)

$$\begin{array}{r} 1 \times 36 = 36 \\ 0.5 \times 36 = 18^+ \\ \hline 1.5 \times 36 = 54 \end{array}$$



Answer 4

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.

$$\begin{aligned} T_{1200} - T_{2500} &= \frac{4500}{1200} - \frac{4500}{2500} \\ &= \underline{\underline{1.95^{\circ}\text{C}}} \end{aligned}$$



Answer 5

y is directly proportional to the square of x .
When $x = 3, y = 36$
Find the value of y when $x = 5$

Find k :

$$k = \frac{y}{x^2}$$

$$k = \frac{36}{3^2}$$

$$k = \frac{36}{9}$$

$$\underline{k = 4}$$

Formula :



$$y = 4x^2$$

$$x = 5: \quad y = 4 \times 5^2$$

$$y = 4 \times 25$$

$$y = \underline{\underline{100}}$$

PROPORTIONALITY

FIND FORMULA FOR
A IN TERMS OF B

FIRST:

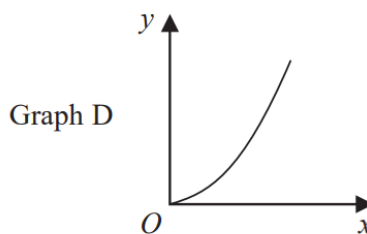
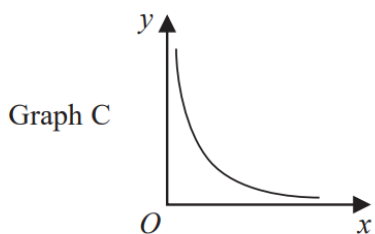
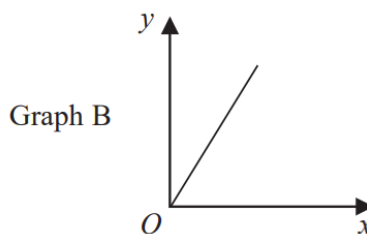
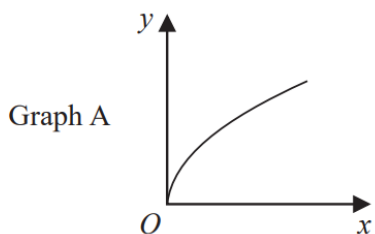
DIRECT: $A = kB$

INVERSE: $A = \frac{k}{B}$

(FIND k !)



Answer 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.

PROPORTIONALITY
FIND FORMULA FOR
A IN TERMS OF B
FIRST:
DIRECT: $A = kB$
INVERSE: $A = \frac{k}{B}$
(FIND k !)

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

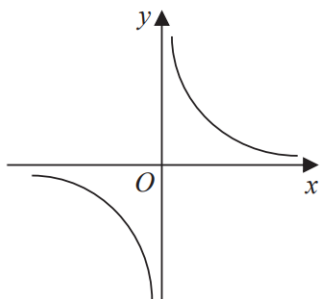
$y = kx$
 $y = kx^2$
 $y = k\sqrt{x}$
 $y = \frac{k}{x}$

PROCESS OF
ELIMINATION!

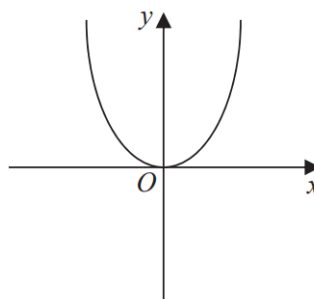


Answer 7

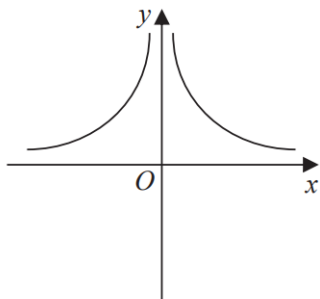
These graphs show four different proportionality relationships between y and x .



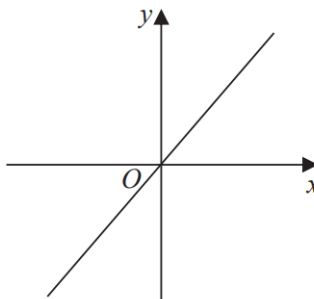
Graph A



Graph B



Graph C



Graph D

Match each graph with a statement in the table below.

PROPORTIONALITY
FIND FORMULA FOR
A IN TERMS OF B
FIRST:
DIRECT: $A = kB$
INVERSE: $A = \frac{k}{B}$
(FIND k !)

Proportionality relationship	Graph letter
y is directly proportional to x	D
y is inversely proportional to x	A
y is proportional to the square of x	B
y is inversely proportional to the square of x	C

$y = kx$
 $y = \frac{k}{x}$
 $y = kx^2$
 $y = \frac{k}{x^2}$



Answer 8

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

x	1	2	5	10
y	100	25	4	1



y is INVERSELY PROPORTIONAL TO x^2
(A) (B)

FORMULA: $y = \frac{k}{x^2}$

$x=10, y=1: 100 \times 1 = \frac{k}{10^2} \times 100$

$100 = k$

So $y = \frac{100}{x^2}$

$x=1: y = \frac{100}{1^2} = \underline{100}$

$x=2: y = \frac{100}{2^2} = \frac{100}{4}$
 $= \underline{25}$

$x=5: y = \frac{100}{5^2} = \frac{100}{25}$
 $= \underline{4}$

PROPORTIONALITY

FIND FORMULA FOR A IN TERMS OF B

FIRST:

DIRECT: $A = kB$

INVERSE: $A = \frac{k}{B}$

(FIND k!)



Answer 9

$$A = T$$

$$B = d^2$$

T is inversely proportional to d^2

$T = 12$ when $d = 8$

Find the value of T when $d = 0.5$

$$A = \frac{k}{B}$$

$$T = \frac{k}{d^2}$$

$$\left. \begin{array}{l} T = 12 \\ d = 8 \end{array} \right\} 64 \times 12 = \frac{k}{64} \times 64$$

$$\begin{aligned} k &= 64 \times 12 \\ &= 768 \end{aligned}$$

$$\text{So } T = \frac{768}{d^2}$$

$$\text{When } d = 0.5, \quad T = \frac{768}{0.5^2}$$

$$T = \underline{\underline{3072}}$$

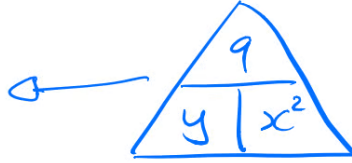
PROPORTIONALITY
FIND FORMULA FOR A IN TERMS OF B
FIRST:
DIRECT: $A = kB$
INVERSE: $A = \frac{k}{B}$
(FIND k !)



Answer 10

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

$$x^2 = \frac{9}{y}$$



$y = 16 :$

$$x^2 = \frac{9}{16}$$

$\sqrt{\quad}$

$$x = \sqrt{\frac{9}{16}}$$

$$x = \frac{3}{4}$$



Answer 11

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.

$$y = \frac{k}{d^2}$$

$$d=10, y=4: 4 = \frac{k}{10^2} \times 100$$

$$400 = k$$

$$\text{so } y = \frac{400}{d^2} \quad \text{--- (1)}$$

$$d = kx^2$$

$$x=2, d=24: \frac{24}{4} = \frac{k \times 2^2}{4}$$

$$6 = k$$

$$\text{so } d = 6x^2 \quad \text{--- (2)}$$

$$\text{(2)} \rightarrow \text{(1)} \quad y = \frac{400}{(6x^2)^2}$$

$$y = \frac{400}{36x^4}$$

<p>PROPORTIONALITY</p> <p>FIND FORMULA FOR A IN TERMS OF B</p> <p>FIRST:</p> <p>DIRECT: $A = kB$</p> <p>INVERSE: $A = \frac{k}{B}$</p> <p>(FIND k!)</p>
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$$(x^2)^2 = x^{2+2} = x^4$$

$$y = \frac{4 \times 100}{4 \times 9x^4}$$

$$y = \frac{100}{9x^4}$$



Answer 12

$A = h$
 $B = r^2$
 h is inversely proportional to the square of r .

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

Find the value of h when $r = 8$

$$AB = k$$

$$h \times r^2 = k$$

Find k :

$$3.4 \times 5^2 = k$$

$$k = 85$$

So: $h r^2 = 85$

$r = 8$:
$$\frac{h \times 8^2}{8^2} = \frac{85}{8^2}$$

$$h = \frac{85}{64}$$

$$h = \underline{\underline{1.33}}$$

INVERSE PROPORTION

IF $A \propto \frac{1}{B}$

THEN $A = \frac{k}{B}$

OR $AB = k$.

WHERE k IS A
CONSTANT WHICH
WE NEED TO FIND



Answer 13

A

The intensity of the sound, I watts/m², received from a loudspeaker is inversely proportional to the square of the distance, d metres, from the loudspeaker.

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

$$B = d^2$$

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

$$A = \frac{k}{B}$$

$$I = \frac{k}{d^2}$$

$$\left. \begin{array}{l} d=2 \\ I=30 \end{array} \right\} 4 \times 30 = \frac{k}{4} \times 4$$

$$\underline{120 = k}$$

$$\text{so } I = \frac{120}{d^2}$$

$$d=10: \quad I = \frac{120}{100}$$

$$\underline{\underline{I = 1.2}}$$

PROPORTIONALITY

FIND FORMULA FOR
A IN TERMS OF B

FIRST:

DIRECT: $A = kB$

INVERSE: $A = \frac{k}{B}$

(FIND k !)



Answer 14

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

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

A
R

y is inversely proportional to the square of x . $\rightarrow B$

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

$$y = \frac{k}{x^2}$$

USE $x=1$
 $y=9$ }

$$9 = \frac{k}{1^2} \Rightarrow k = 9$$

$$\underline{y = \frac{9}{x^2}}$$

PROPORTIONALITY

FIND FORMULA FOR
A IN TERMS OF B

FIRST:

DIRECT: $A = kB$

INVERSE: $A = \frac{k}{B}$

(FIND k !)



Answer 15

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

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

Find the value of y when $x = 64$

$$y = k \times \sqrt[3]{x}$$

$$1\frac{1}{6} = k \times \sqrt[3]{8}$$

$$\frac{7}{6} = \frac{k \times 2}{2}$$

$$\frac{7}{12} = k$$

$$\text{So } y = \frac{7}{12} \times \sqrt[3]{x}$$

$$x=64: y = \frac{7}{12} \times \sqrt[3]{64}$$

$$= \frac{7}{12} \times 4$$

$$= \frac{7}{3} \quad \left(= 2\frac{1}{3} \right)$$

PROPORTIONALITY

FIND FORMULA FOR
A IN TERMS OF B

FIRST:

DIRECT: $A = kB$

INVERSE: $A = \frac{k}{B}$

(FIND k !)

CUBES

$$2^3 = 8$$

$$3^3 = 27$$

$$4^3 = 64$$