Directly and inversely proportionality past paper questions

1.

y is directly proportional to the square root of t.
$y = 15$ when $t = 9$

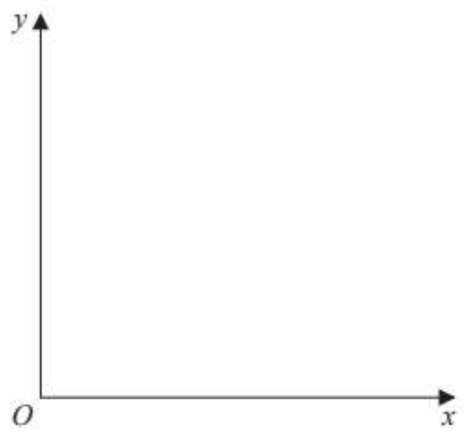
t is inversely proportional to the cube of x.
$t = 8$ when $x = 2$

Find a formula for y in terms of x.
Give your answer in its simplest form.

2.

(a) Using the axes below, sketch a graph to represent the statement

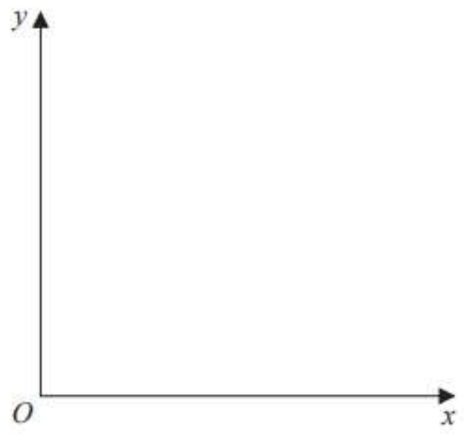
y is directly proportional to x



(1)

(b) Using the axes below, sketch a graph to represent the statement

y is inversely proportional to x



(1)

3.

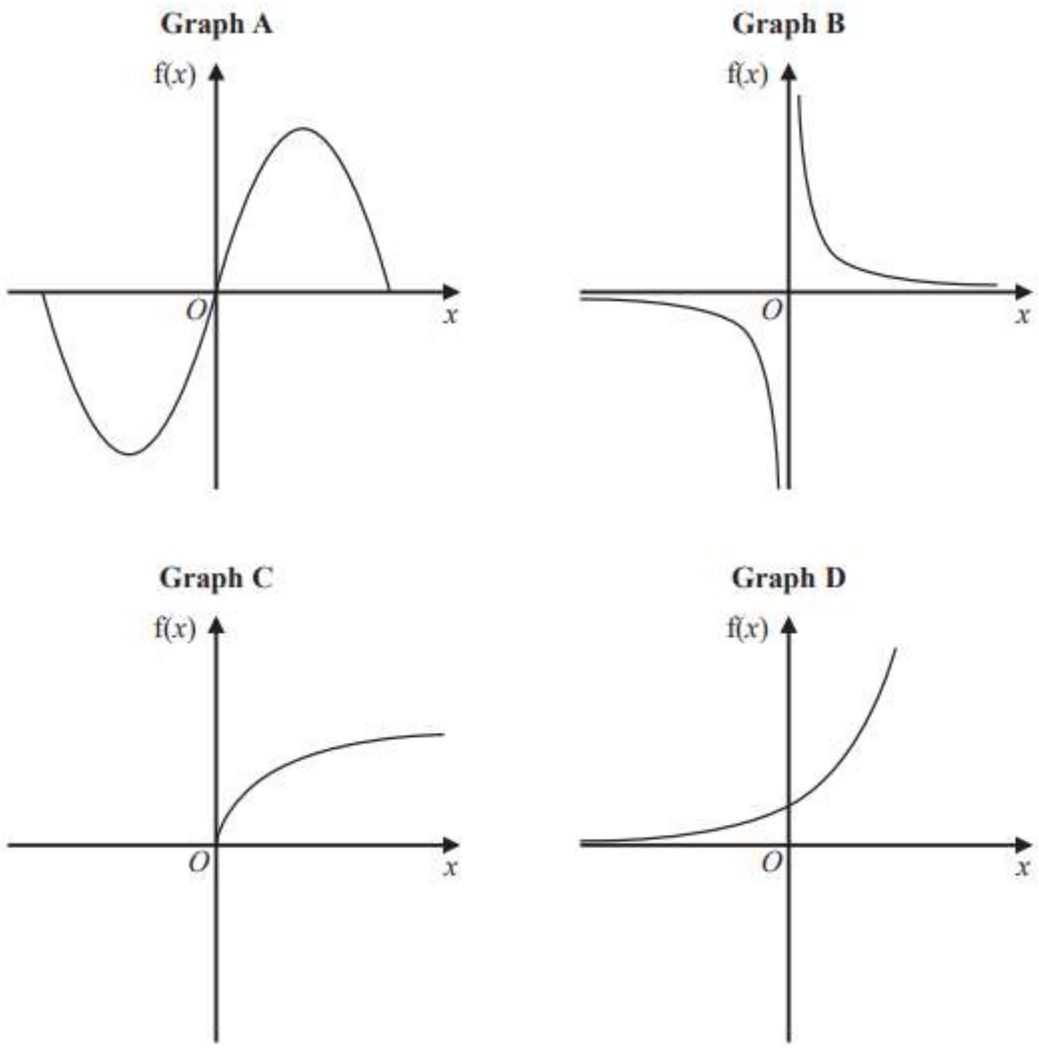
x is directly proportional to the square of y.
y is directly proportional to the cube of z.

$z = 2$ when $x = 32$

Find a formula for x in terms of z.

4.

Here are four graphs.



The graphs represent four different types of function f.

Match each description of the function in the table to the letter of its graph.

Description of function	**Graph**
$f(x)$ is inversely proportional to x	
$f(x)$ is a trigonometrical function	
$f(x)$ is an exponential function	
$f(x)$ is directly proportional to $\sqrt{x}$	

5.

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

6.

y is inversely proportional to x^3

$y = 44$ when $x = a$

Show that $y = 5.5$ when $x = 2a$

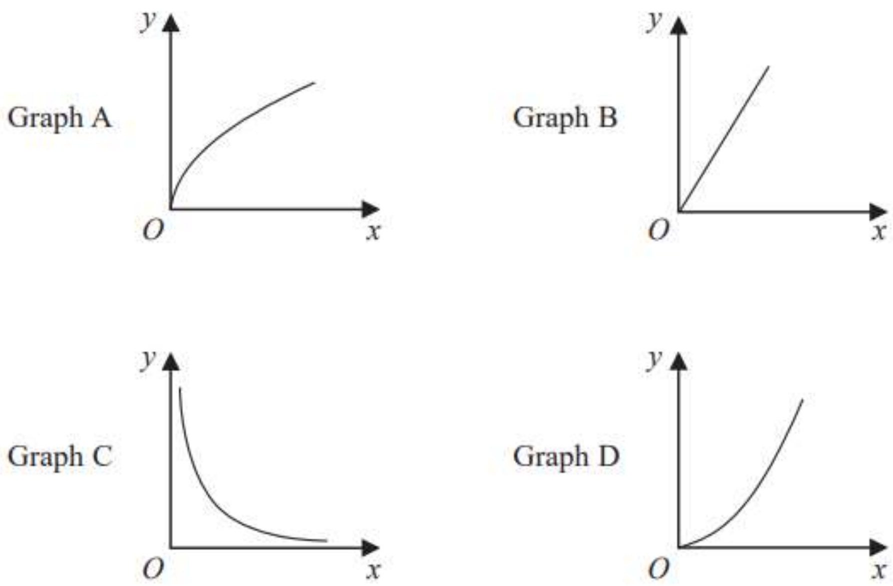
7.

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.

8.



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**
$y \propto x$	
$y \propto x^2$	
$y \propto \sqrt{x}$	
$y \propto \frac{1}{x}$	

9.

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

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

Find the value of y when $x = 64$

10.

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.

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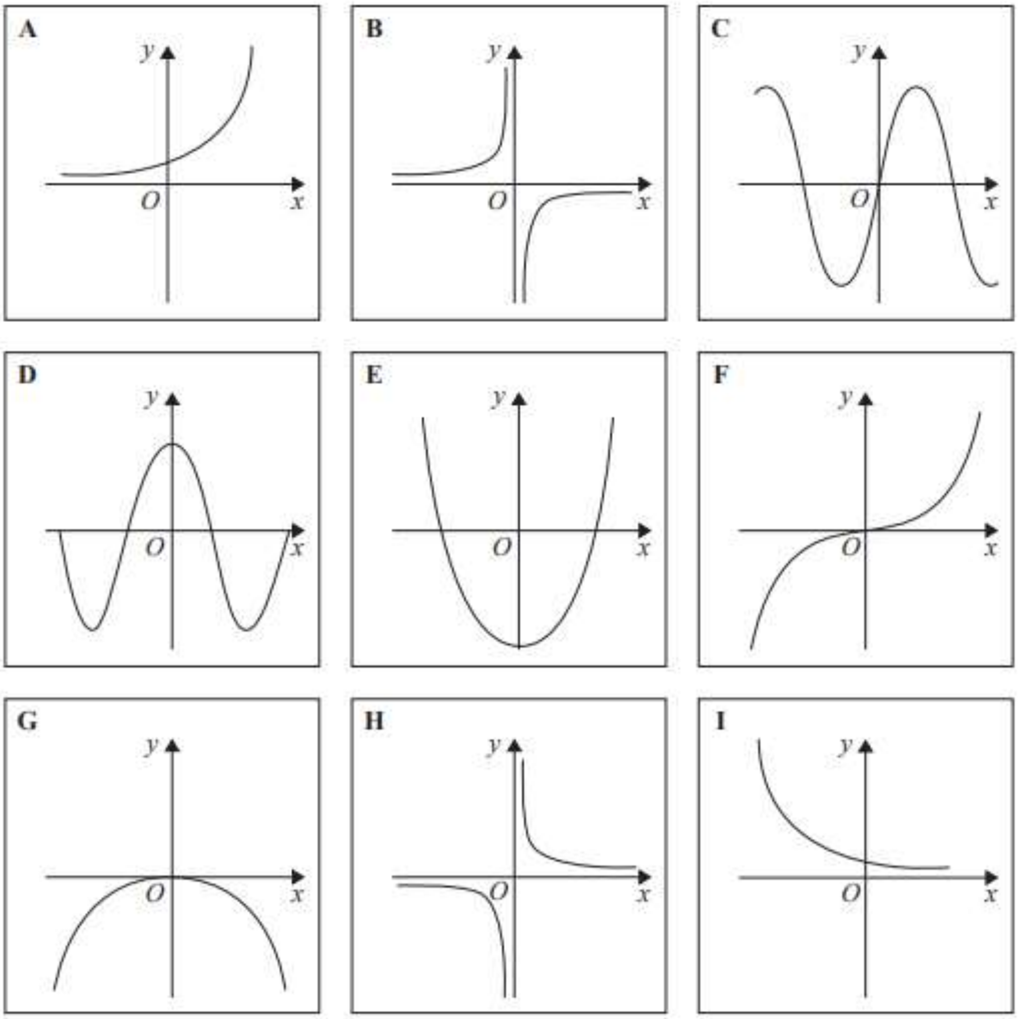
(b) Find the positive value of x when $y = 16$

11.

Here are some graphs.



In the table below, match each equation with the letter of its graph.

Equation	Graph
$y = \sin x$	
$y = x^3 + 4x$	
$y = 2^x$	
$y = \dfrac{4}{x}$	

12.

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

Find the value of y when $x = 6$

13.

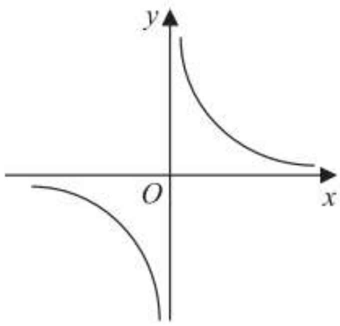
D is directly proportional to the cube of n.

Mary says that when n is doubled, the value of D is multiplied by 6

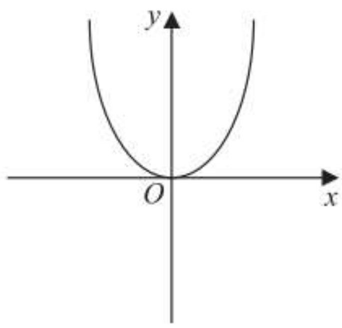
Mary is wrong.
Explain why.

14.

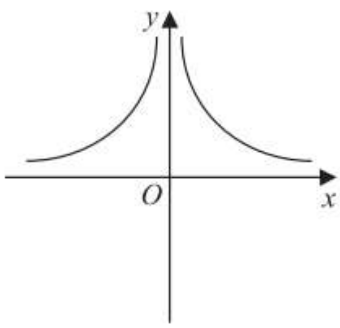
These graphs show four different proportionality relationships between y and x.



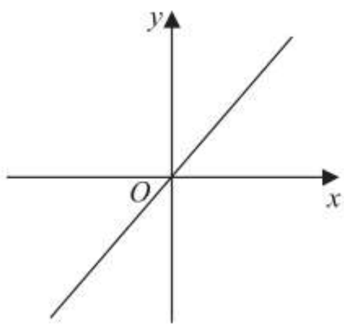
Graph A



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	

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.