Maths-it Podcast H-05

Higher GCSE Revision

Proportionality

Topics

Solve problems involving direct and inverse proportion, e.g. $y \propto x$, $y \propto x^2$, $y \propto \frac{1}{x}$, $y \propto \frac{1}{x^2}$

Find and use equations of this type – Relate to the graphs of these equations

Questions

1. The electric field intensity, E, of a charge varies inversely as the square of the distance from it, d.

When $d = 0.3$, $E = 40$

(a) Find a formula for E in terms of d.

.....

(3)

(b) Hence, or otherwise, calculate the value of E when $d = 2$

E = ...

(1)

(Total 4 marks)

2. p is inversely proportional to $\sqrt{m}$.
$p = 22$ when $m = 25$

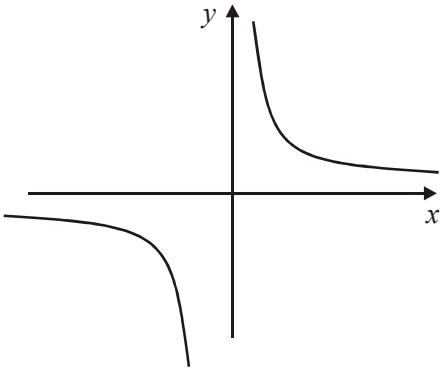
Calculate the value of p when $m = 4$

.....

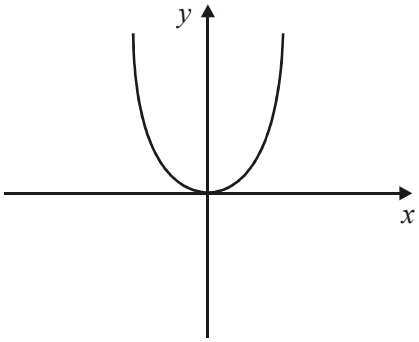
(Total 2 marks)

Proportionality

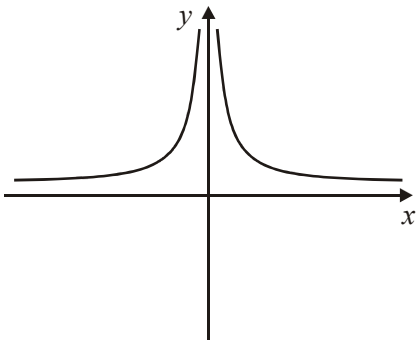
3.



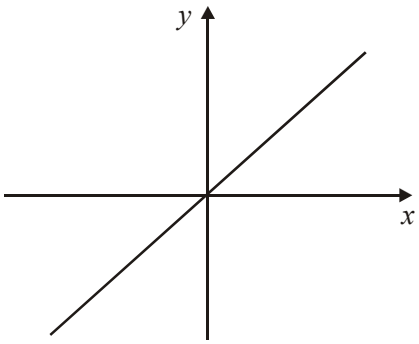
Graph **A**



Graph **B**



Graph **C**



Graph **D**

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

Write down the letter of the graph which represents the type of proportionality.

Type of proportionality	**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	.....

(Total 2 marks)

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4. The kinetic energy, K Joules, of a moving object is directly proportional to the square of its velocity, v m/s.

When $v = 6$ m/s, $K = 90$ J

Find the value of v when $K = 40$

v = ...

(Total 4 marks)

5. p is inversely proportional to q.
$p = 15$ when $q = 0.15$

Calculate the value of p when $q = 6$.

……

(Total 3 marks)

6. The weight of a length of climbing rope is directly proportional to its length.

A 40 m length of rope has a weight of 2.4 kilograms.
Another length of the same rope is 55 m long.

Calculate the weight of the 55 m length of rope.

…….. kg

(Total 2 marks)

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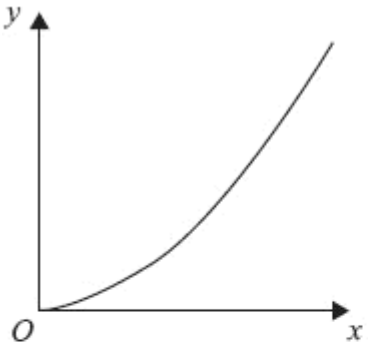
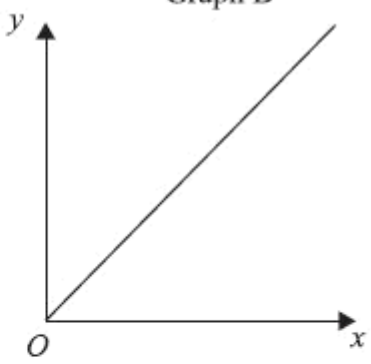
7.

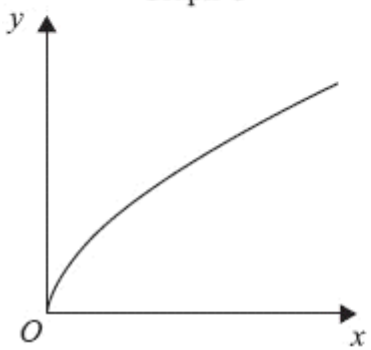
Graph A



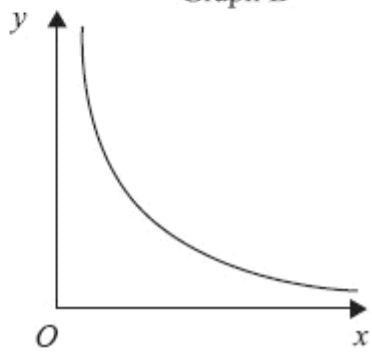
Graph B



Graph C



Graph D



For $k > 0$ each graph matches with one of the equations,

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

Match each graph to its equation,

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

(Total 3 marks)