

1MA1 Higher themed papers: Direct and inverse proportion

Write your name here	
Surname	Other names
Centre Number	Candidate Number
Pearson Edexcel Level 1/Level 2 GCSE (9–1)	
Mathematics Direct and inverse proportion	
	Paper Reference 1MA1
You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.	Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- You must **show all your working.**
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.

Information

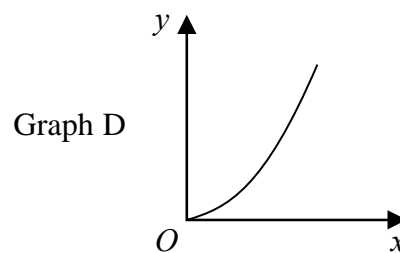
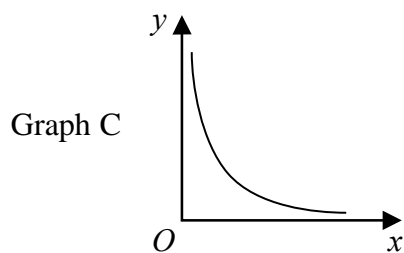
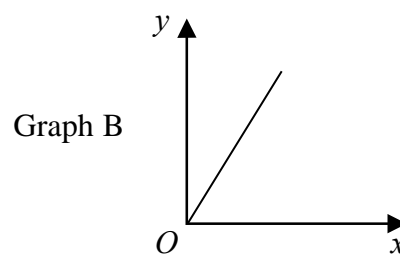
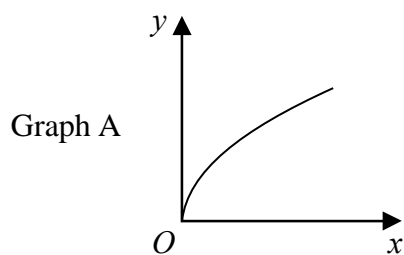
- The total mark for this paper is **34**. There are **12** questions.
- Questions have been arranged in an ascending order of mean difficulty, as found by all students in the June 2017–November 2019 examinations.
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

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1



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

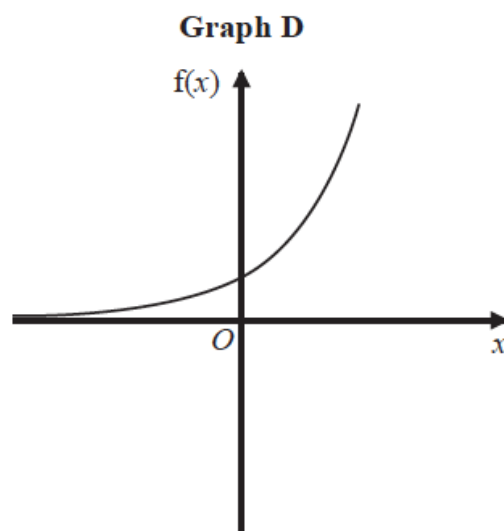
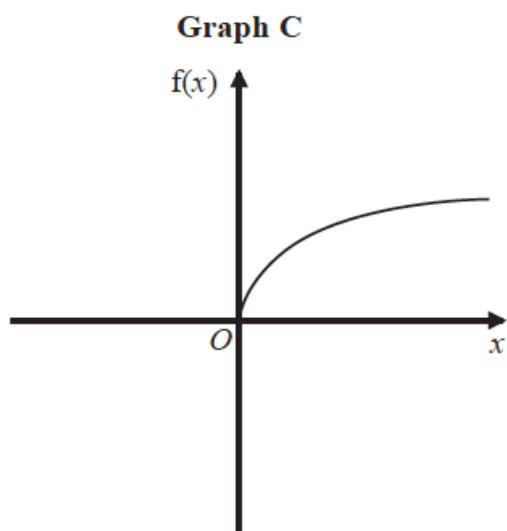
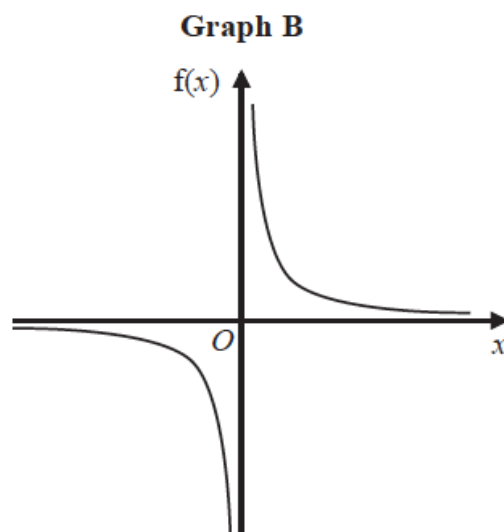
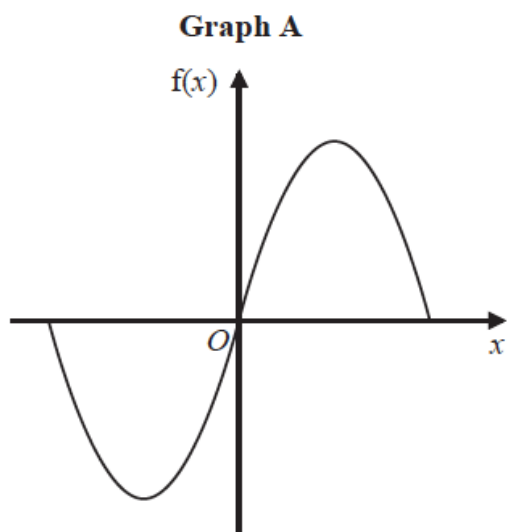
Match each type of proportionality in the table to the correct graph.

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

(Total for Question 1 is 2 marks)

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2 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}	

(Total for Question 2 is 2 marks)

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3

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

.....
(Total for Question 3 is 4 marks)

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4

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.

.....
(Total for Question 4 is 5 marks)

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5 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 .

.....
(2)

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

.....
(2)

(Total for Question 5 is 4 marks)

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6 y is inversely proportional to the square of x .

$$y = 8 \text{ when } x = 2.5$$

Find the negative value of x when $y = \frac{8}{9}$

.....
(Total for Question 6 is 3 marks)

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7 y is inversely proportional to x^3

$$y = 44 \text{ when } x = a$$

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

(Total for Question 7 is 3 marks)

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8

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

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

Find the value of y when $x = 64$

.....
(Total for Question 8 is 3 marks)

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9 T is inversely proportional to the cube of u .

When $u = 5$, $T = 0.0096$

Find the value of u when $T = 0.15$

.....
(Total for Question 9 is 3 marks)

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10 P is inversely proportional to the square root of m .

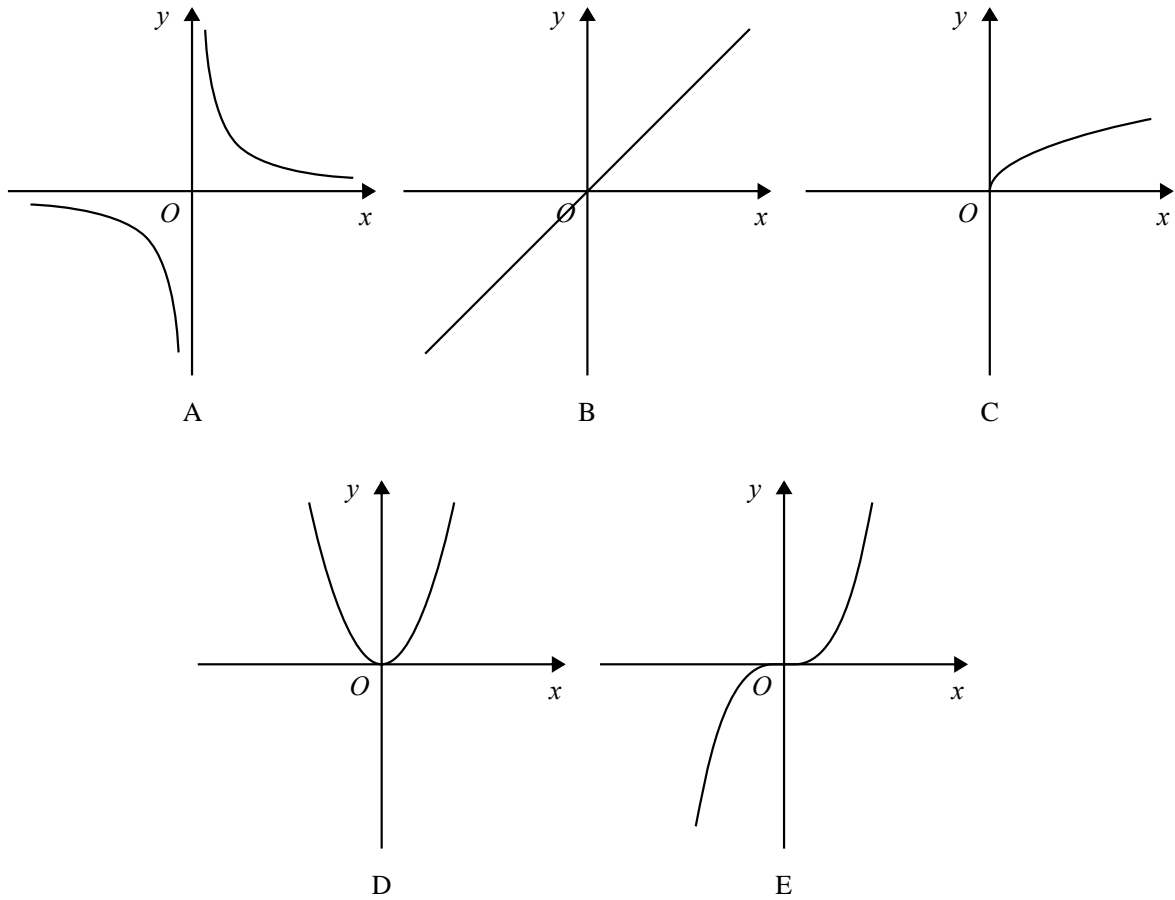
$$P = 10 \text{ when } m = \frac{1}{4}$$

Work out the value of m when $P = 2$

.....
(Total for Question 10 is 3 marks)

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- 11** Here are five graphs.
Each graph shows either direct proportion or inverse proportion.



The table shows five equations.

Equation	Graph
$y = kx^3$
$y = k\sqrt{x}$
$y = kx^2$
$y = \frac{k}{x}$
$y = kx$

Match the letter of each graph to its equation.

(Total for Question 11 is 3 marks)

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- 12** y is inversely proportional to the square of x .
 $y = 1$ when $x = 10$

Find the value of y when $x = 5$

$y = \dots\dots\dots$

(Total for Question 12 is 3 marks)

TOTAL MARKS FOR PAPER: 34