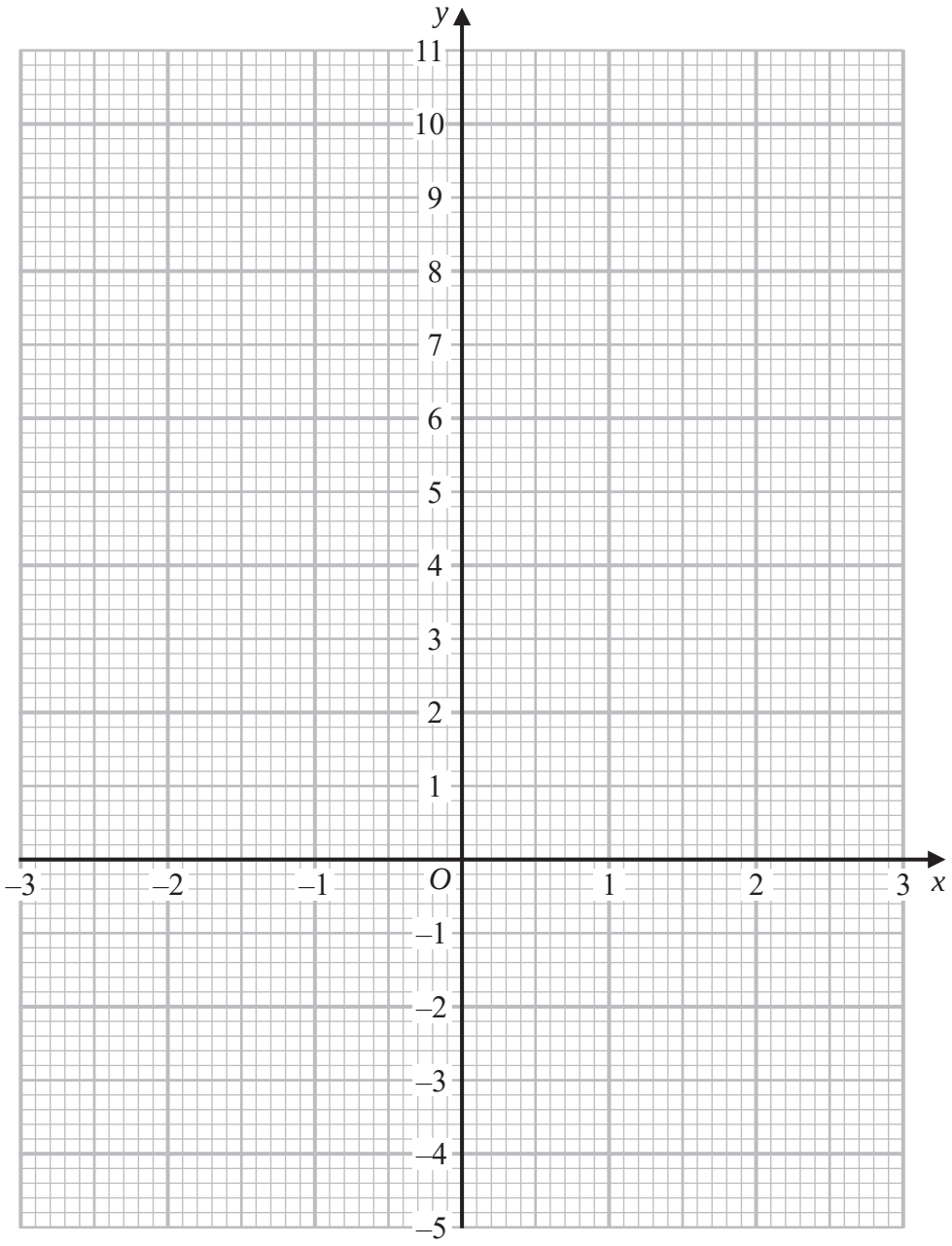
1 (a) Complete the table of values for $y = \frac{1}{2}x^3 - 2x + 3$

x	–3	–2	–1	0	1	2	3
y	–4.5			3		3	

(2)

(b) On the grid, draw the graph of $y = \frac{1}{2}x^3 - 2x + 3$ for $-3 \leqslant x \leqslant 3$



(2)

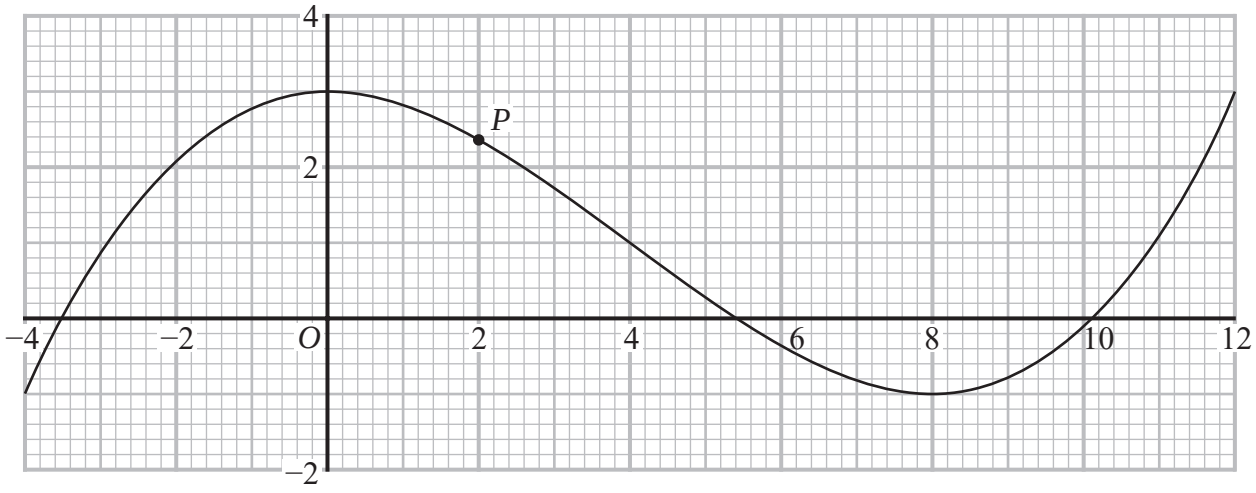
(c) By drawing a suitable straight line on the grid, find an estimate for the solution of the equation $\frac{1}{2}x^3 - x + 4 = 0$

$x =$.....

(2)

(Total for Question 1 is 6 marks)

2 The diagram shows the graph of $y = f(x)$ for $-4 \leqslant x \leqslant 12$



The point P on the curve has x coordinate 2

(a) (i) Use the graph to find an estimate for the gradient of the curve at P.

.....

(3)

(ii) Hence find an equation of the tangent to the curve at P.
Give your answer in the form $y = mx + c$

.....

(2)

The equation $f(x) = k$ has exactly two different solutions for $-4 \leqslant x \leqslant 12$

(b) Use the graph to find the two possible values of k.

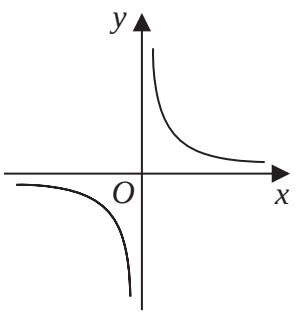
..... , ...

(2)

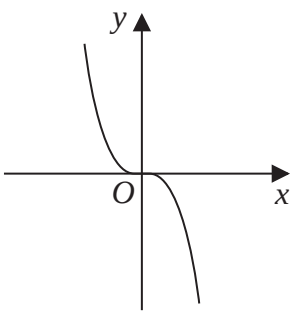
(Total for Question 2 is 7 marks)

3 Here are six graphs.

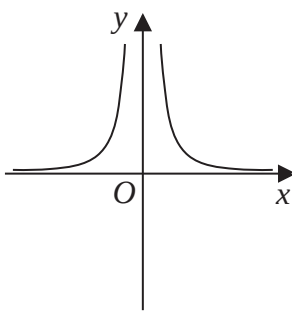
Graph A



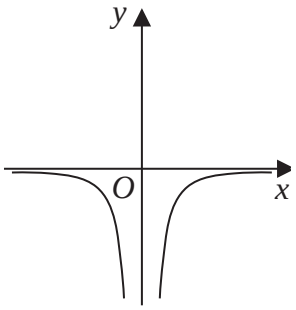
Graph B



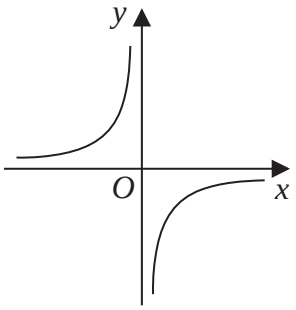
Graph C



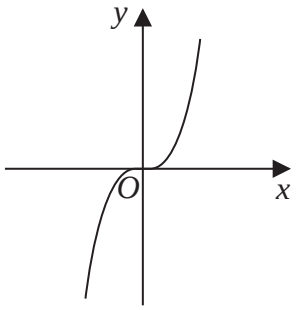
Graph D



Graph E



Graph F



Complete the table below with the letter of the graph that could represent each given equation.

Write your answers on the dotted lines.

Equation	Graph
$y = \frac{2}{x^2}$	.....
$y = -\frac{1}{2}x^3$	.....
$y = -\frac{5}{x}$	.....

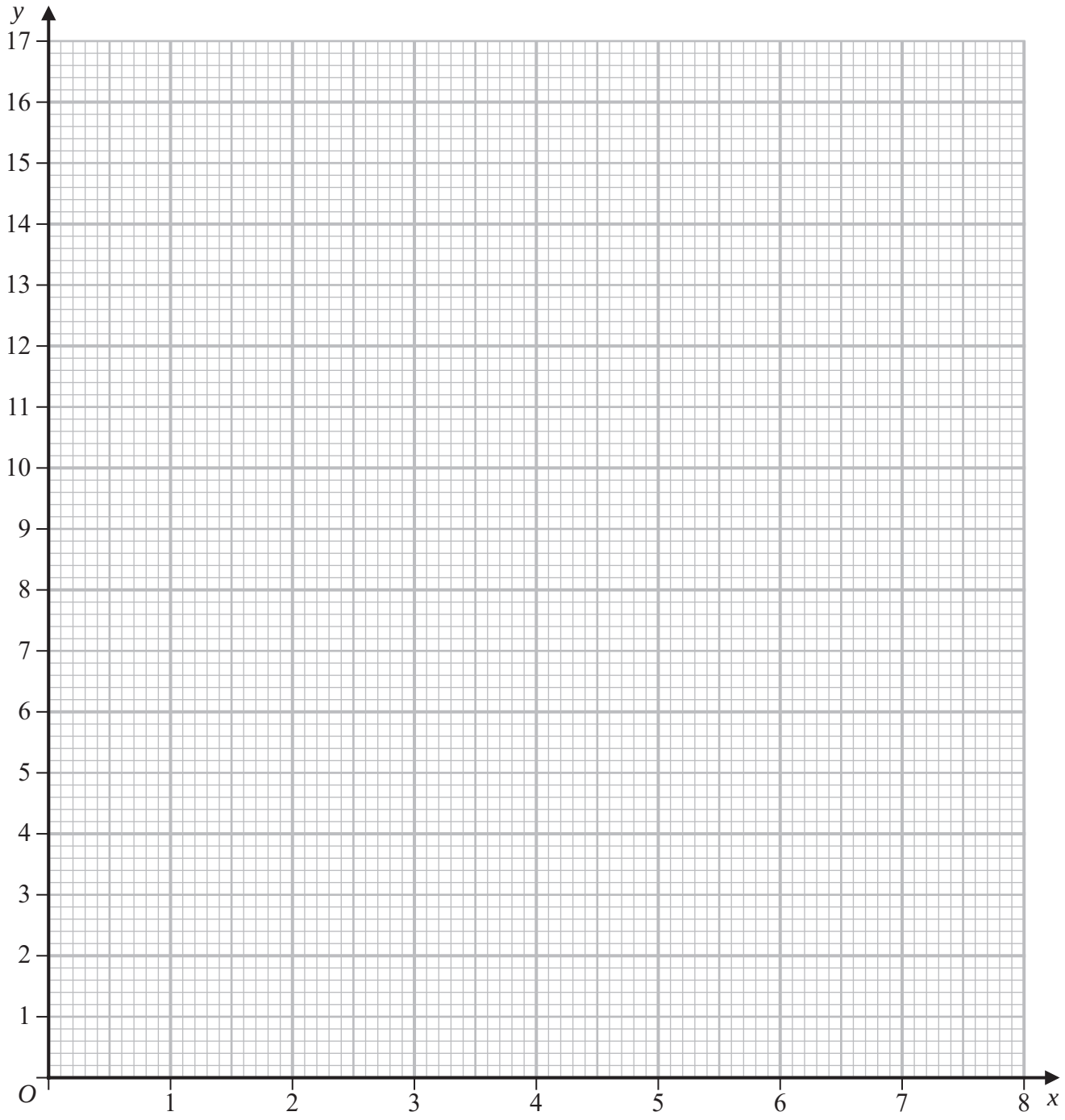
(Total for Question 3 is 3 marks)

4 (a) Complete the table of values for $y = \frac{1}{x}(x^2 + 4)$

x	0.25	0.5	1	2	4	8
y	16.25					8.5

(2)

(b) On the grid, draw the graph of $y = \frac{1}{x}(x^2 + 4)$ for $0.25 \leqslant x \leqslant 8$



(2)

(Total for Question 4 is 4 marks)

5 The point A is the only stationary point on the curve with equation $y = kx^2 + \frac{16}{x}$ where k is a constant.

Given that the coordinates of A are $\left(\frac{2}{3}, a\right)$

find the value of a.
Show your working clearly.

$a =$ .....

(Total for Question 5 is 5 marks)

6 The diagram shows a sketch of part of the curve with equation $y = x^2 - \frac{p}{x}$ where p is a positive constant.

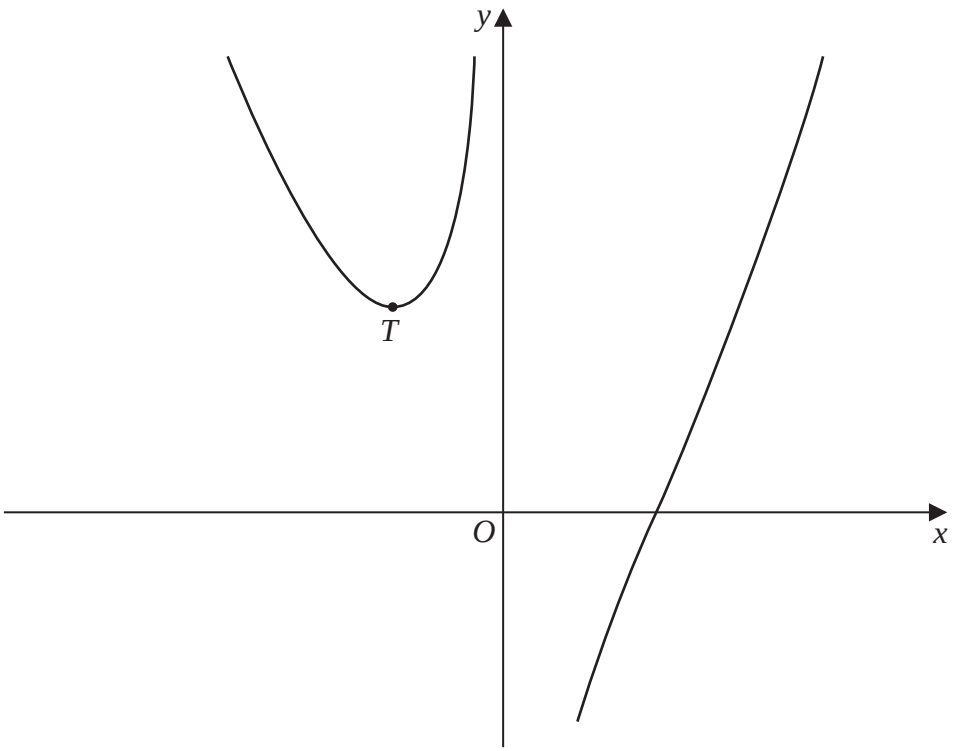


Diagram **NOT** accurately drawn

For all values of p, the curve has exactly one turning point and this turning point is a minimum shown as the point T in the sketch.

For the curve where the x coordinate of T is -3

(a) find the value of p

$p =$ .....

(4)

The line with equation $y = k$ is a tangent to the curve with equation $y = x^2 - \frac{16}{x}$

(b) Find the value of k

$k =$ .....

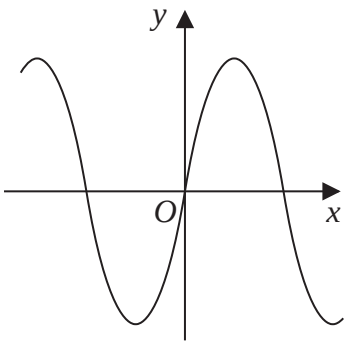
(3)

(Total for Question 6 is 7 marks)

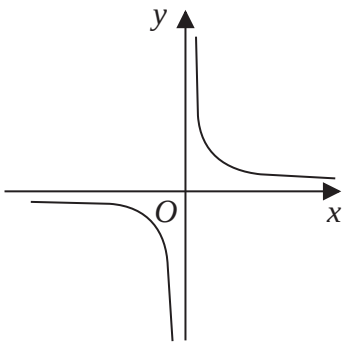
Turn over for Question 23

7 Here are nine graphs.

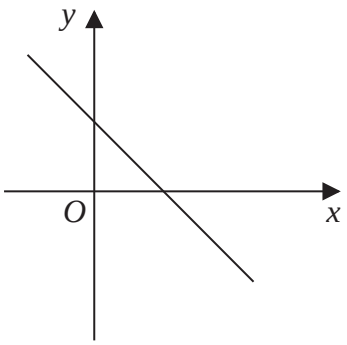
Graph A



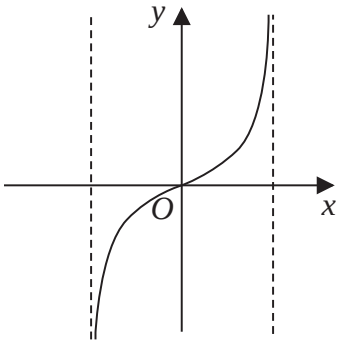
Graph B



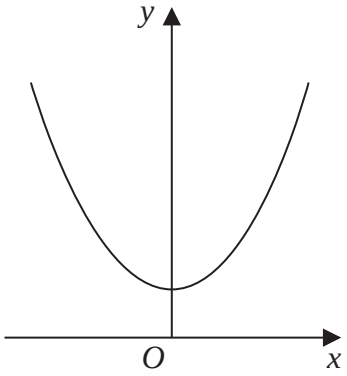
Graph C



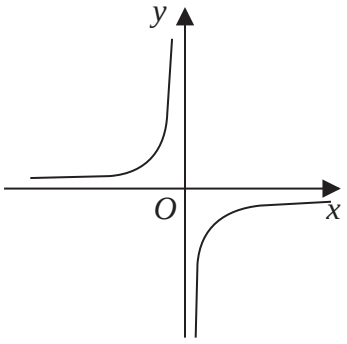
Graph D



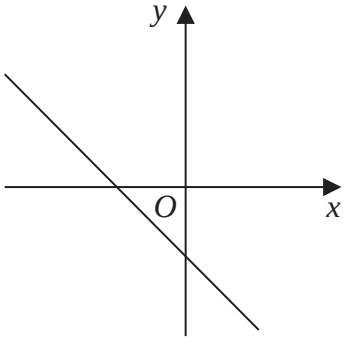
Graph E



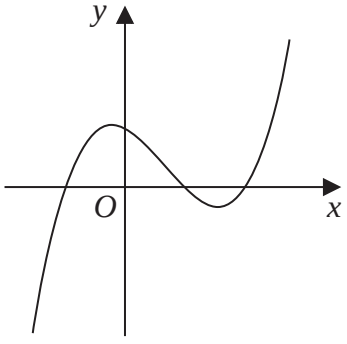
Graph F



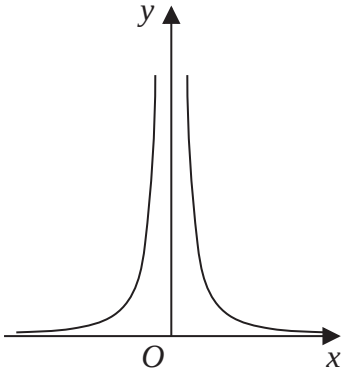
Graph G



Graph H



Graph I



Complete the table below with the letter of the graph that could represent each given equation.
Write each answer on the dotted line.

Equation	Graph
$y = -2x + 3$	.....
$y = -\frac{1}{x}$	.....
$y = \tan x°$	.....
$y = (x + 1)(x - 1)(x - 2)$	.....

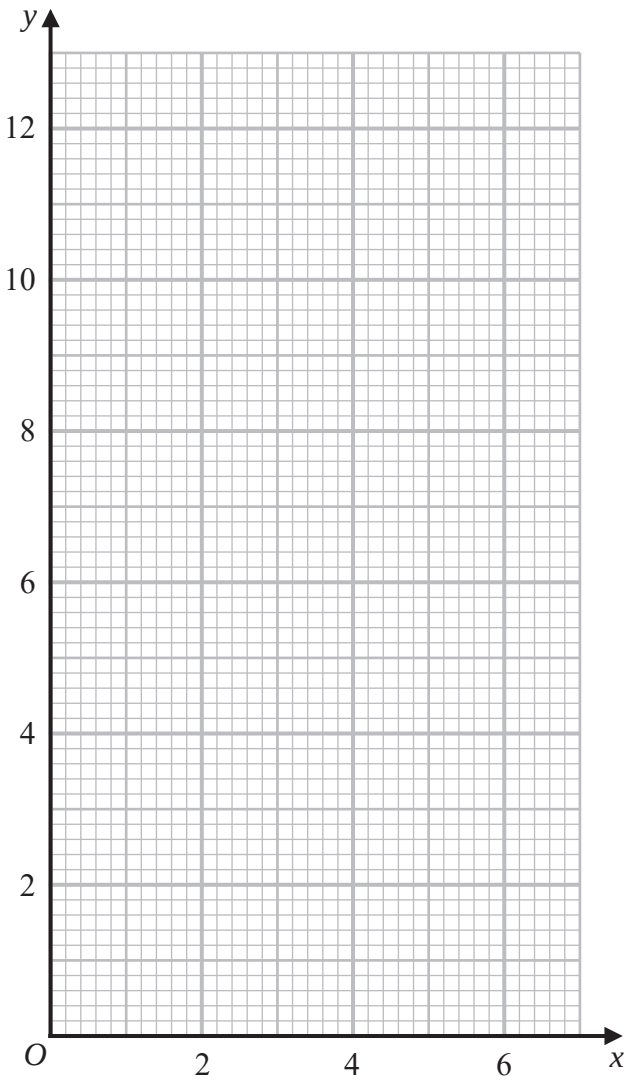
(Total for Question 7 is 3 marks)

8 (a) Complete the table of values for $y = \frac{6}{x}$

x	0.5	1	2	3	4	5	6
y		6		2			1

(2)

(b) On the grid, draw the graph of $y = \frac{6}{x}$ for $0.5 \leqslant x \leqslant 6$



(2)

(Total for Question 8 is 4 marks)

9 The curve **C** has equation $y = ax^3 + bx^2 - 12x + 6$ where a and b are constants.

The point A with coordinates $(2, -6)$ lies on **C**
The gradient of the curve at A is 16

Find the y coordinate of the point on the curve whose x coordinate is 3
Show clear algebraic working.

$y =$ .....

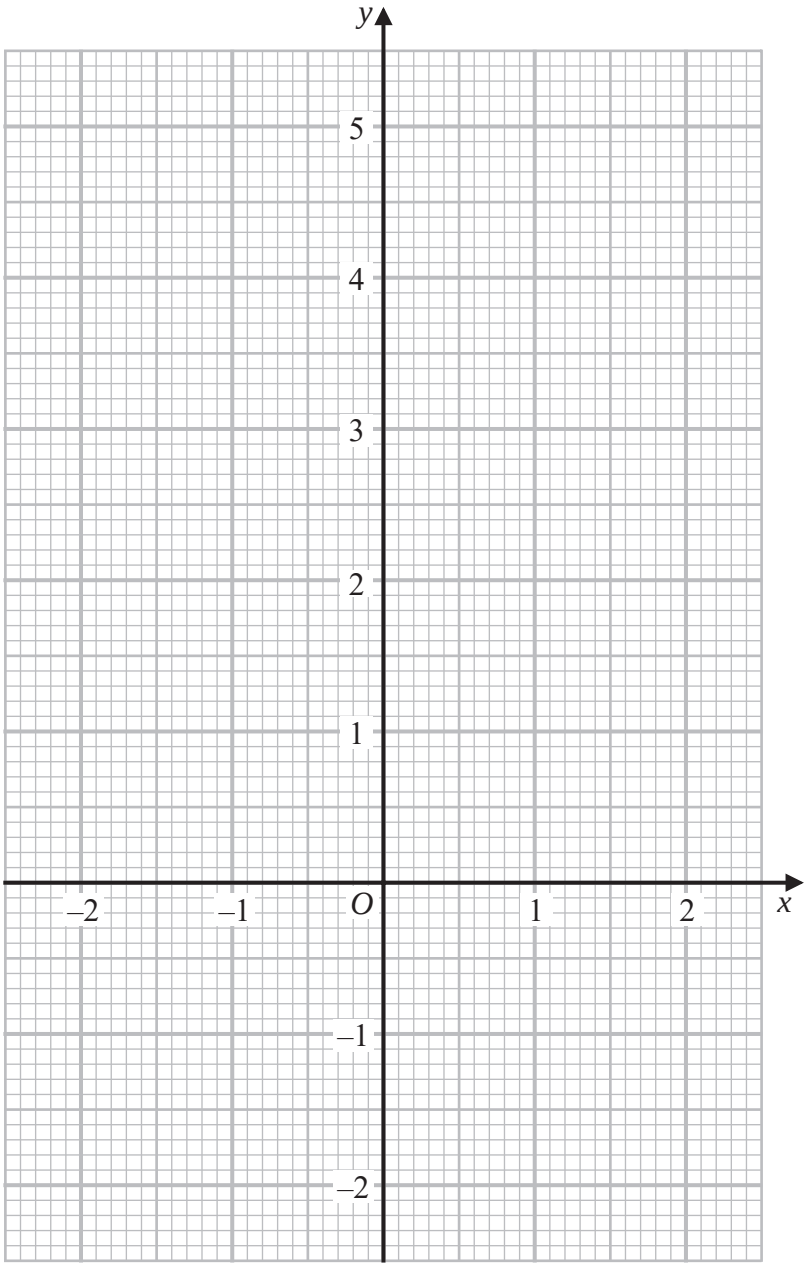
(Total for Question 9 is 6 marks)

10 (a) Complete the table of values for $y = x^3 - 3x + 2$

x	–2	–1	–0.5	0	1	1.5	2
y		4	3.4		0	0.9	

(2)

(b) On the grid, draw the graph of $y = x^3 - 3x + 2$ for values of x from –2 to 2



(2)

(c) By drawing a suitable straight line on the grid, use your graph to find an estimate for the solution of

$$2x^3 - 3x + 4 = 0$$

Give your answer correct to one decimal place.

.....

(3)

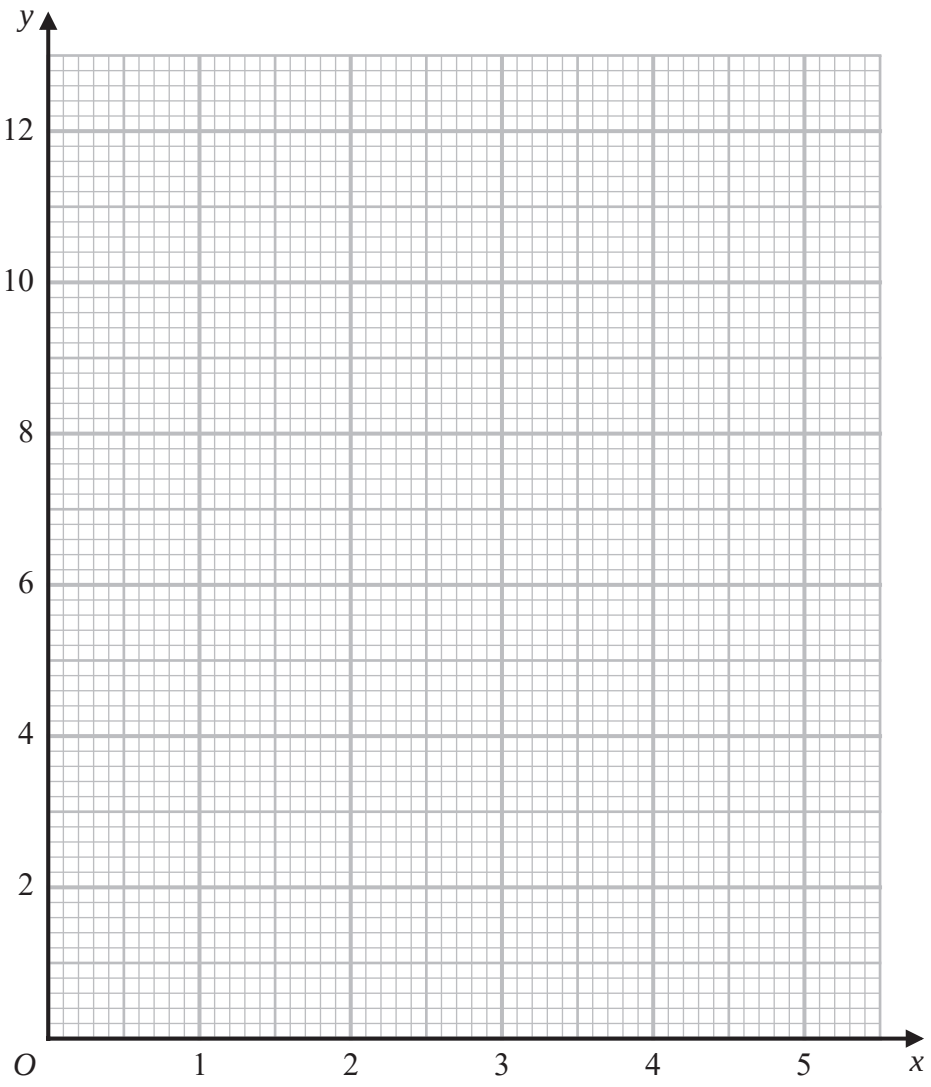
(Total for Question 10 is 7 marks)

11 (a) Complete the table of values for $y = \frac{2}{x}\left(5 - \frac{1}{x}\right)$

x	0.5	1	2	3	4	5
y		8		3.1	2.4	1.9

(1)

(b) On the grid, draw the graph of $y = \frac{2}{x}\left(5 - \frac{1}{x}\right)$ for $0.5 \leqslant x \leqslant 5$

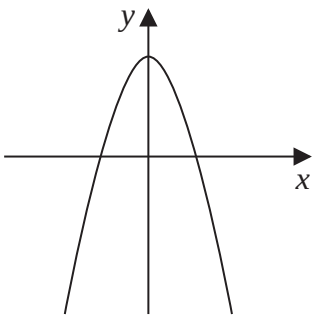


(2)

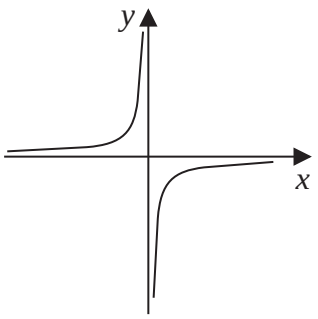
(Total for Question 11 is 3 marks)

12 Here are six graphs.

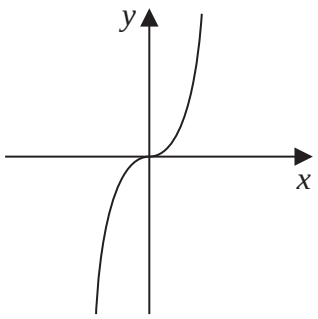
Graph A



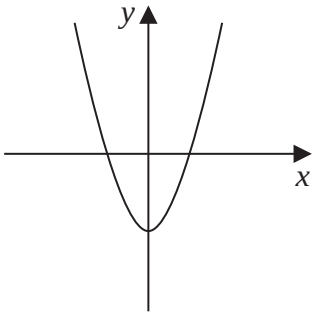
Graph B



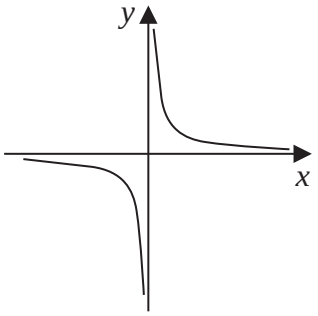
Graph C



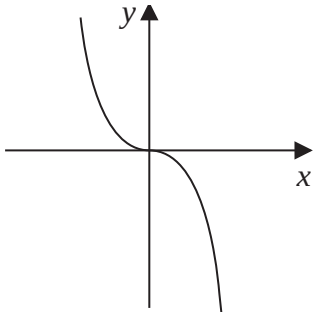
Graph D



Graph E



Graph F



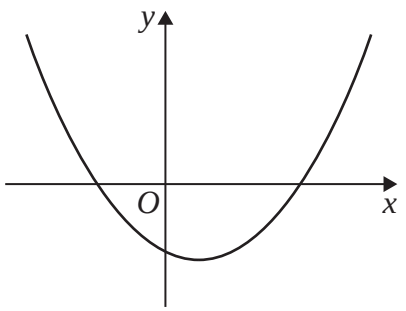
Complete the table below with the letter of the graph that could represent each given equation.
Write your answers on the dotted lines.

Equation	Graph
$y = -\frac{2}{x}$	.....
$y = 5 - x^2$	.....
$y = -2x^3$	.....

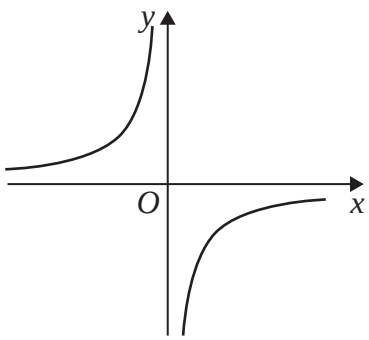
(Total for Question 12 is 3 marks)

13 Here are six graphs.

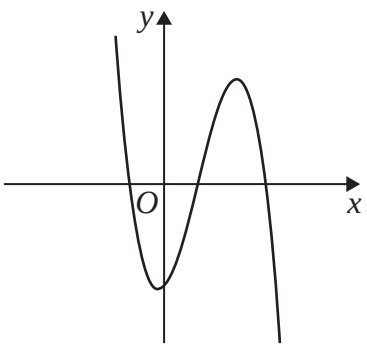
Graph **A**



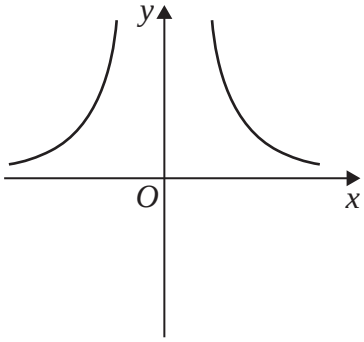
Graph **B**



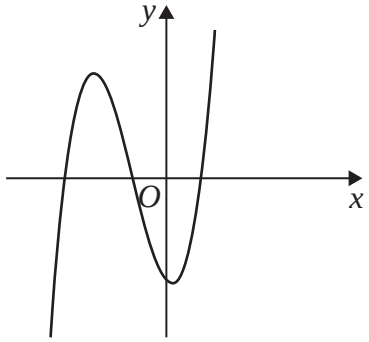
Graph **C**



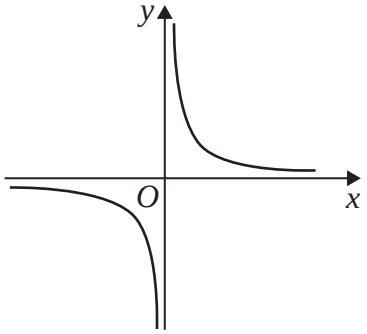
Graph **D**



Graph **E**



Graph **F**



Write down the letter of the graph of

(a) $y = \frac{10}{x^2}$

.....

(1)

(b) $y = x - 3 + 3x^2 - x^3$

.....

(1)

(c) $y = -\frac{3}{x}$

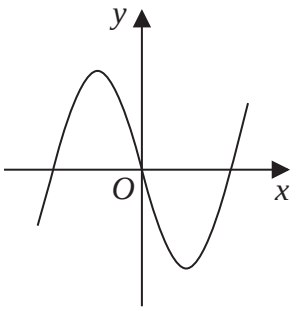
.....

(1)

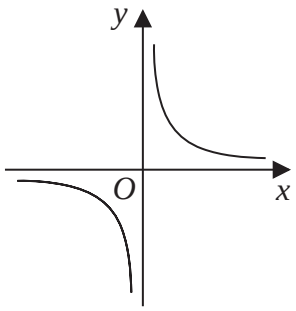
(Total for Question 13 is 3 marks)

14 Here are 6 graphs.

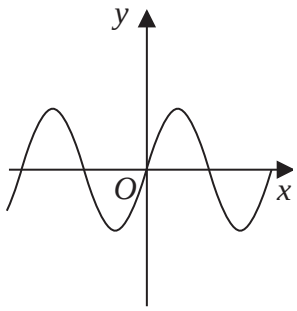
Graph A



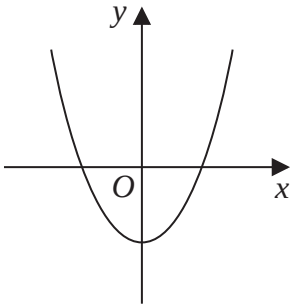
Graph B



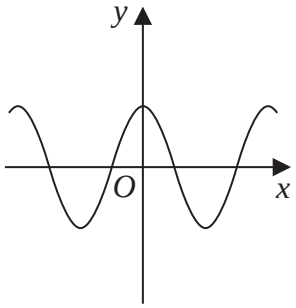
Graph C



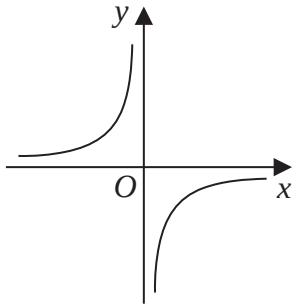
Graph D



Graph E



Graph F



Complete the table below with the letter of the graph that could represent each given equation.

Write your answers on the dotted lines.

Equation	Graph
$y = \sin x$	.....
$y = -\frac{3}{x}$	.....
$y = 4x^3 - 5x$	.....

(Total for Question 14 is 3 marks)