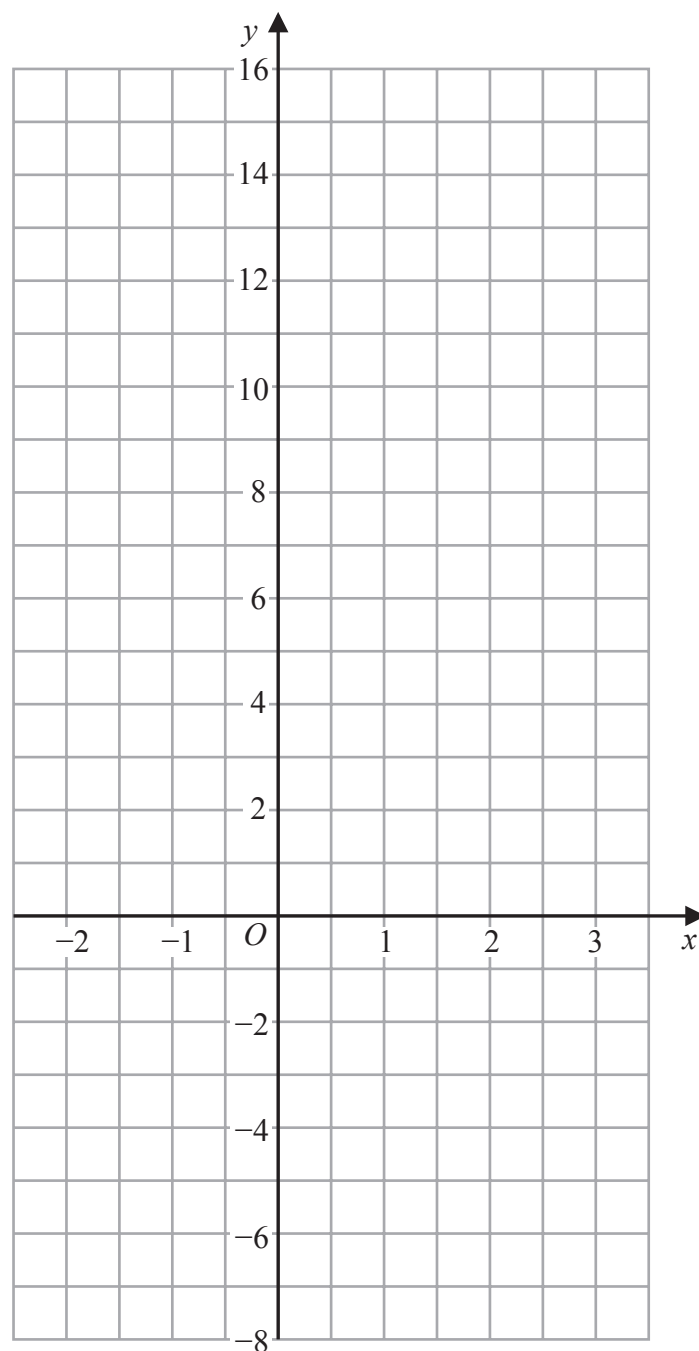


1

On the grid, draw the graph of $y = 7 - 4x$ for values of x from -2 to 3



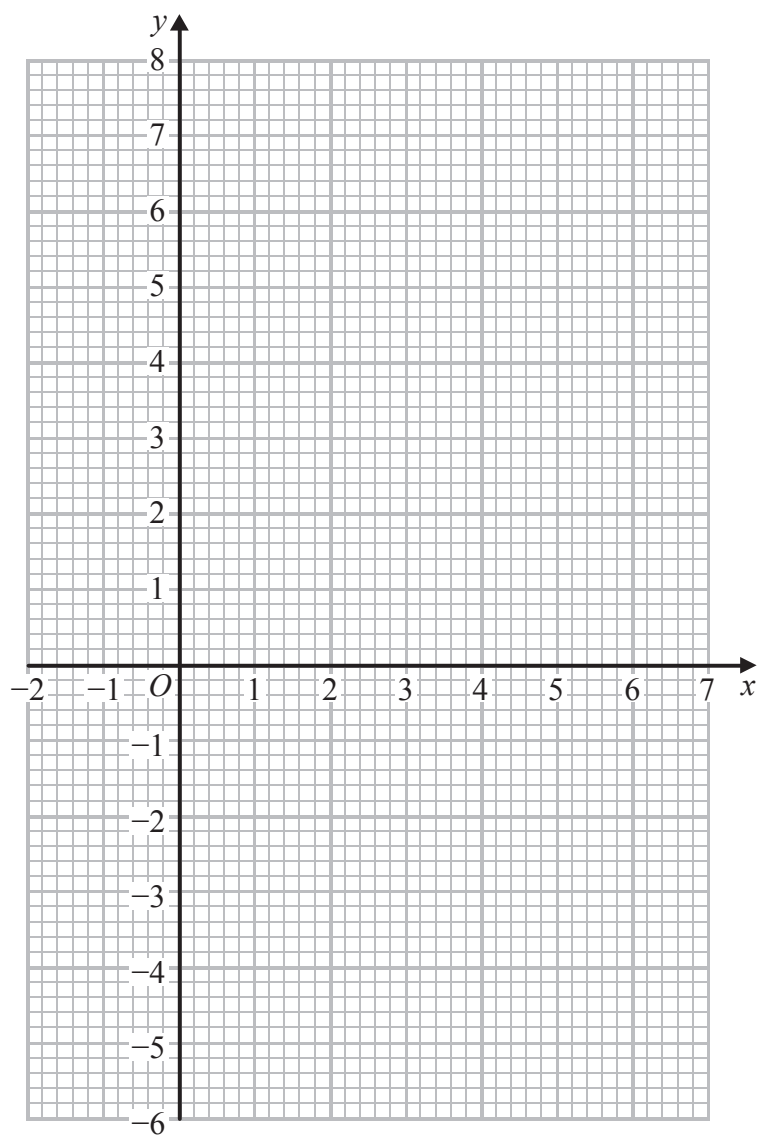
(Total for Question 1 is 3 marks)

2 (a) Complete the table of values for $y = 1 + 5x - x^2$

x	-1	0	1	2	3	4	5	6
y		1		7	7		1	

(2)

(b) On the grid, draw the graph of $y = 1 + 5x - x^2$ for values of x from -1 to 6



(2)

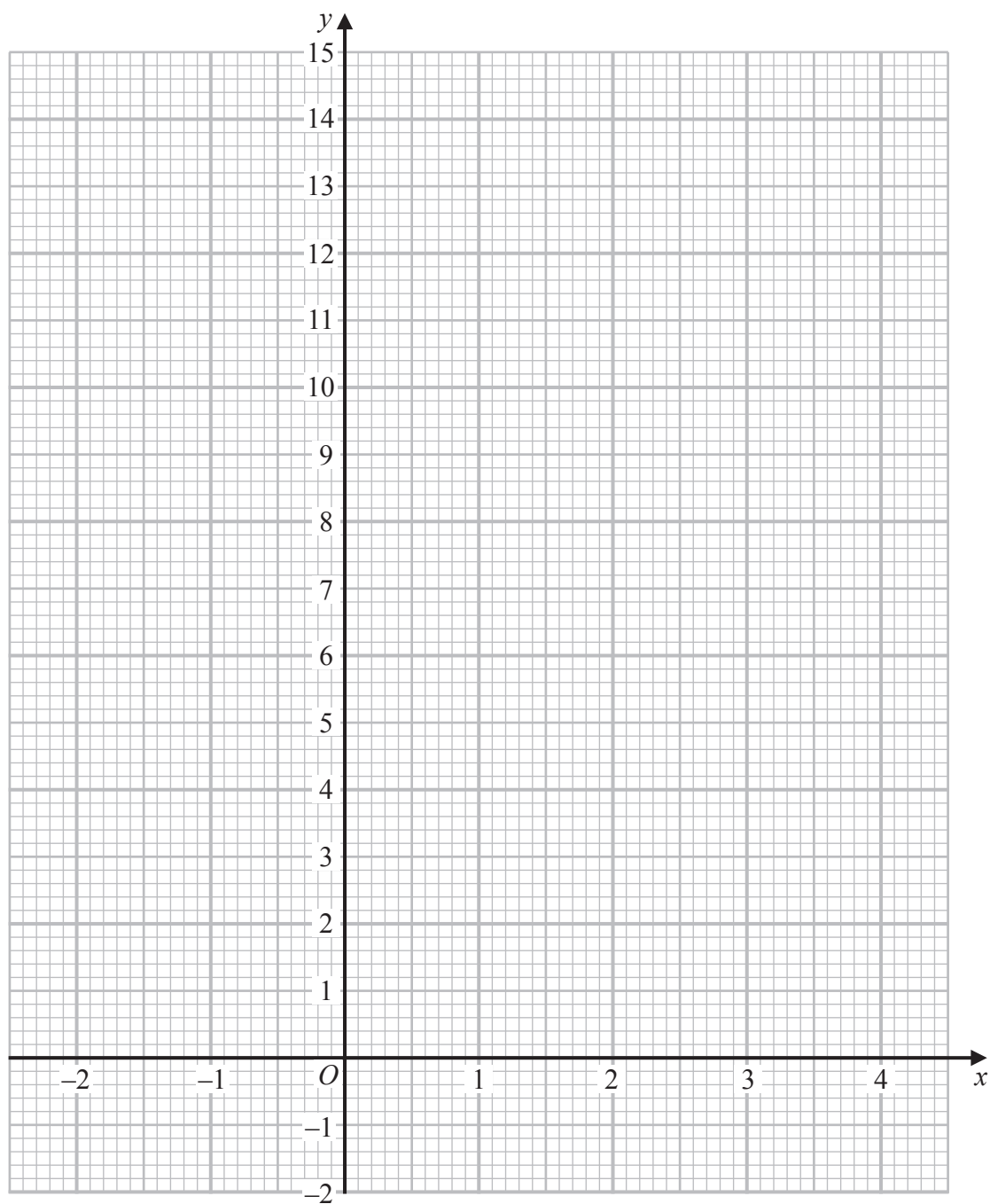
(Total for Question 2 is 4 marks)

- 3 (a) Complete the table of values for $y = x^2 - 4x + 3$

x	-2	-1	0	1	2	3	4
y		8	3			0	

(2)

- (b) On the grid, draw the graph of $y = x^2 - 4x + 3$ for values of x from -2 to 4



(2)

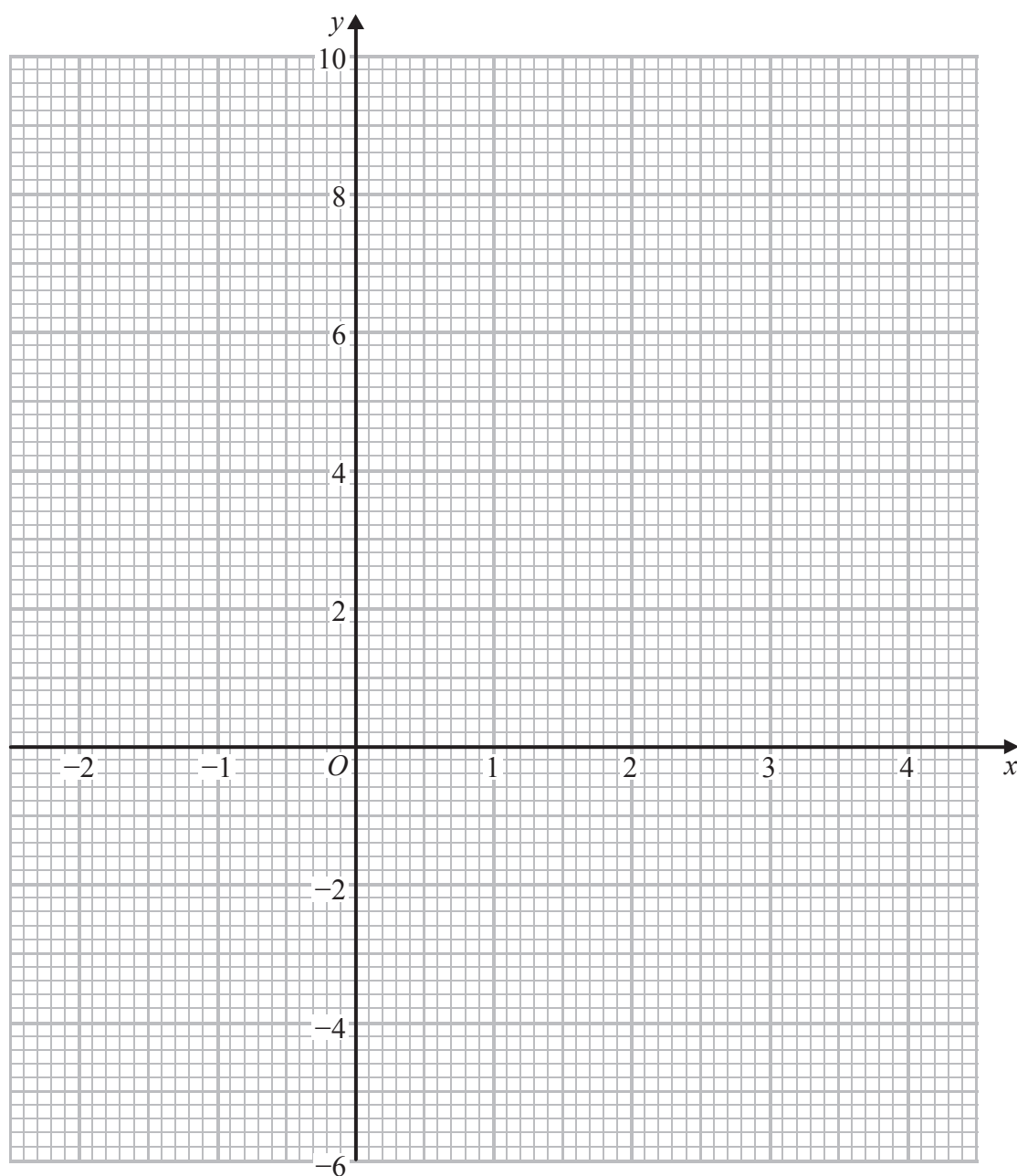
(Total for Question 3 is 4 marks)

- 4 (a) Complete the table of values for $y = x^2 - 3x - 1$

x	-2	-1	0	1	2	3	4
y			-1		-3		3

(2)

- (b) On the grid, draw the graph of $y = x^2 - 3x - 1$ for all values of x from -2 to 4



(2)

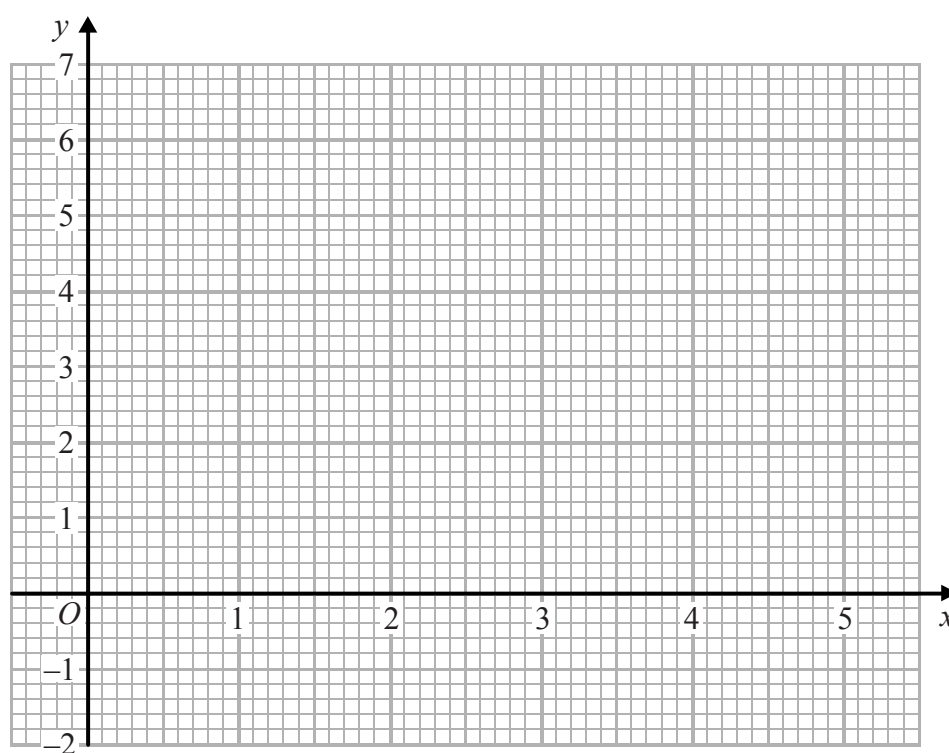
(Total for Question 4 is 4 marks)

- 5 (a) Complete the table of values for $y = x^2 - 5x + 6$

x	0	1	2	3	4	5
y	6		0	0	2	

(1)

- (b) On the grid, draw the graph of $y = x^2 - 5x + 6$ for $0 \leq x \leq 5$



(2)

- (c) By drawing a suitable straight line on the grid, find estimates for the solutions of the equation

$$x^2 - 5x = x - 7$$

(3)

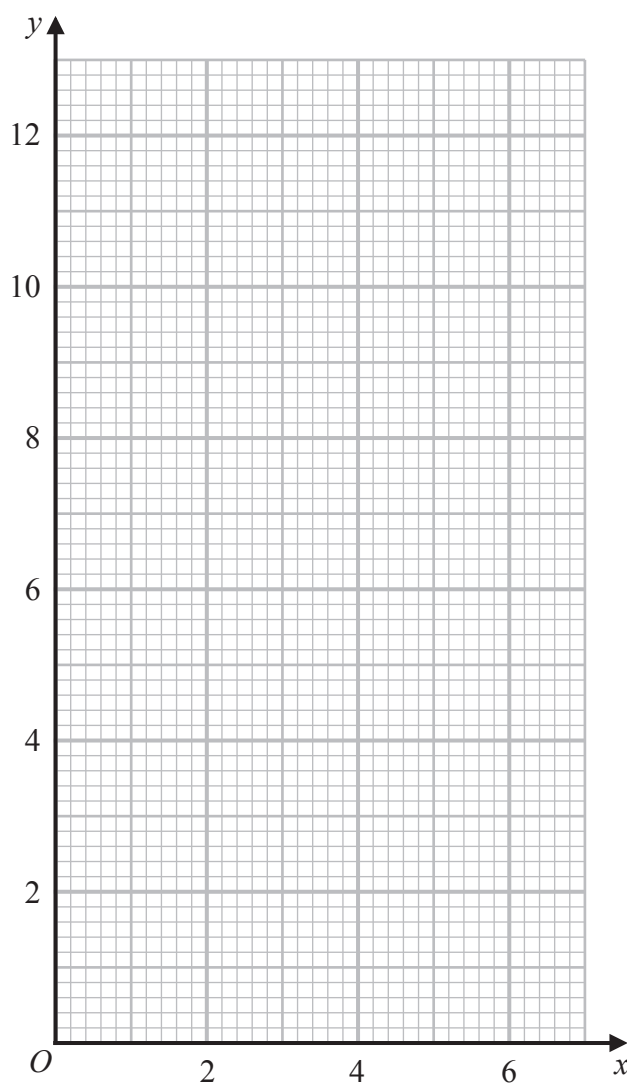
(Total for Question 5 is 6 marks)

- 6 (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 $0.5 \leq x \leq 6$



(2)

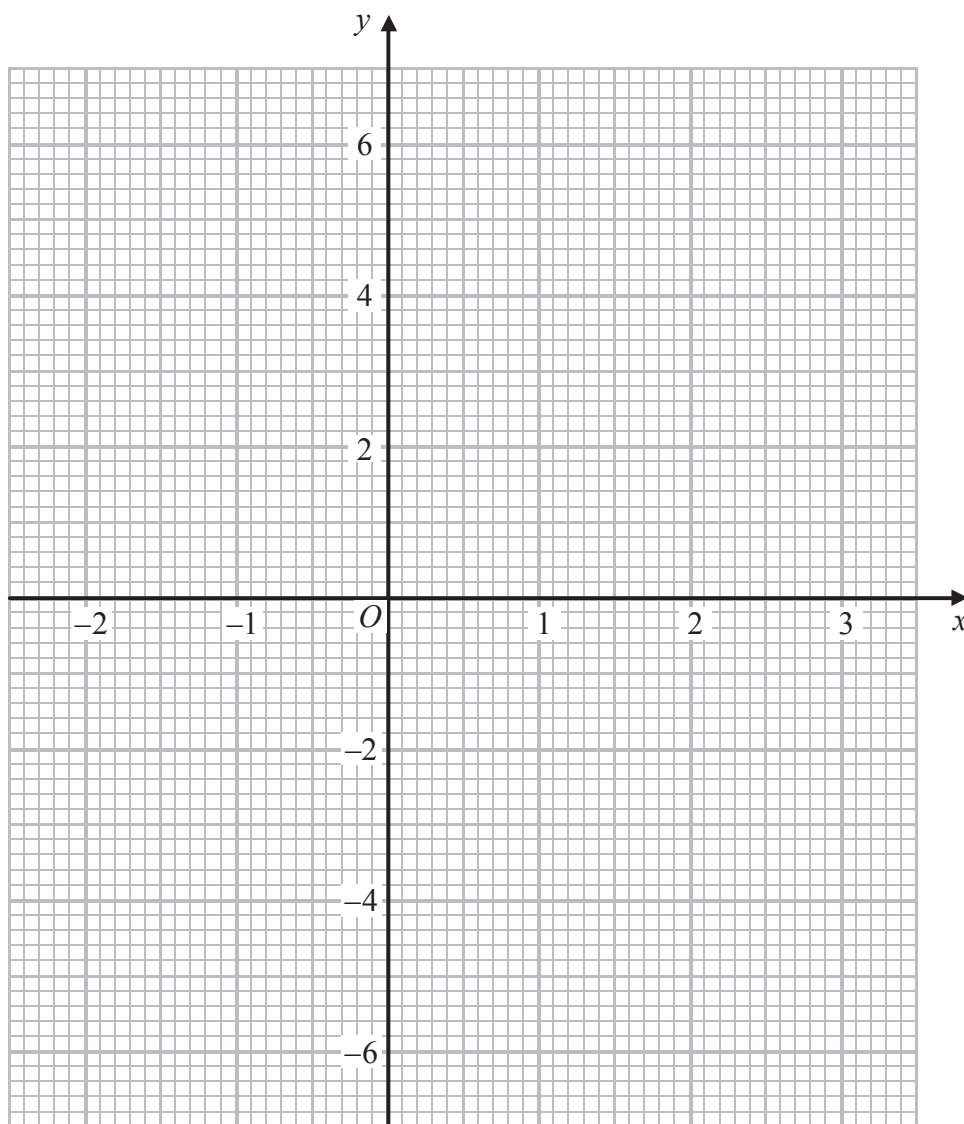
(Total for Question 6 is 4 marks)

7 (a) Complete the table of values for $y = x^3 - 2x^2 - 3x + 4$

x	-2	-1	-0.5	0	1	1.5	2	3
y			4.875	4		-1.625		

(2)

(b) On the grid, draw the graph of $y = x^3 - 2x^2 - 3x + 4$ for values of x from -2 to 3



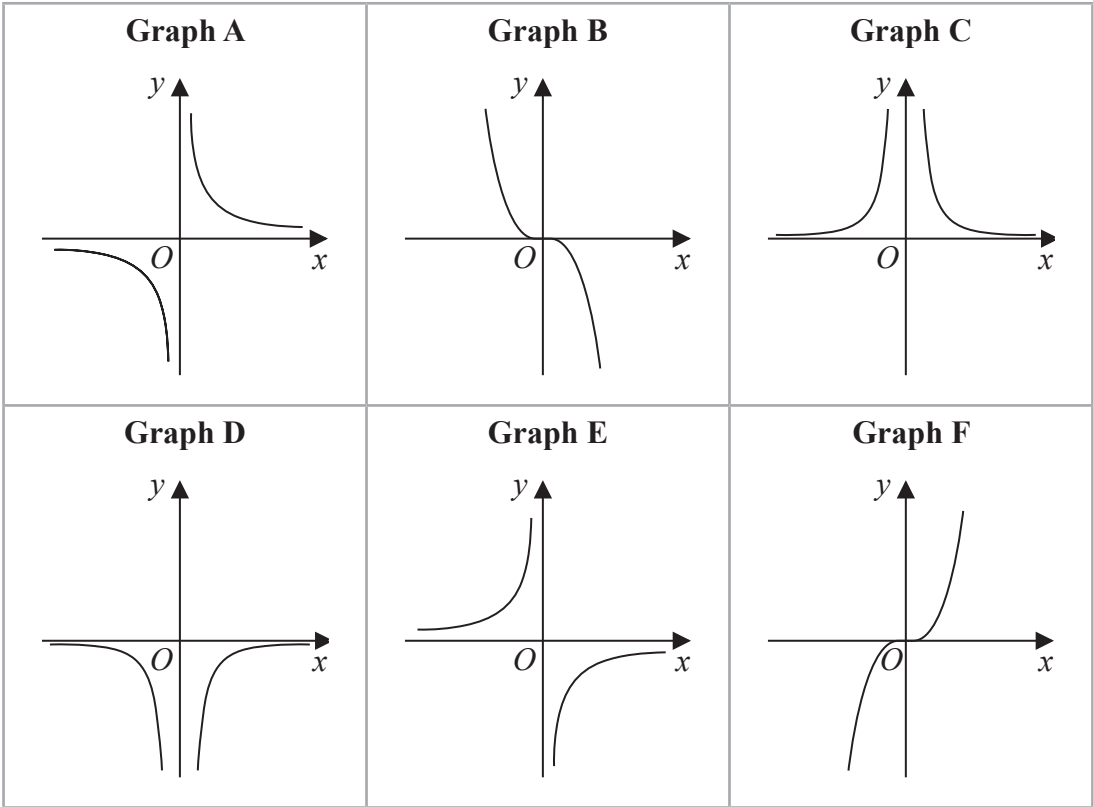
(2)

- (c) By drawing a suitable straight line on the grid,
find estimates for the solutions of the equation $x^3 - 2x^2 - x + 1 = 0$
Give your solutions correct to 1 decimal place.

.....
(4)

(Total for Question 7 is 8 marks)

8 Here are six graphs.



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 8 is 3 marks)

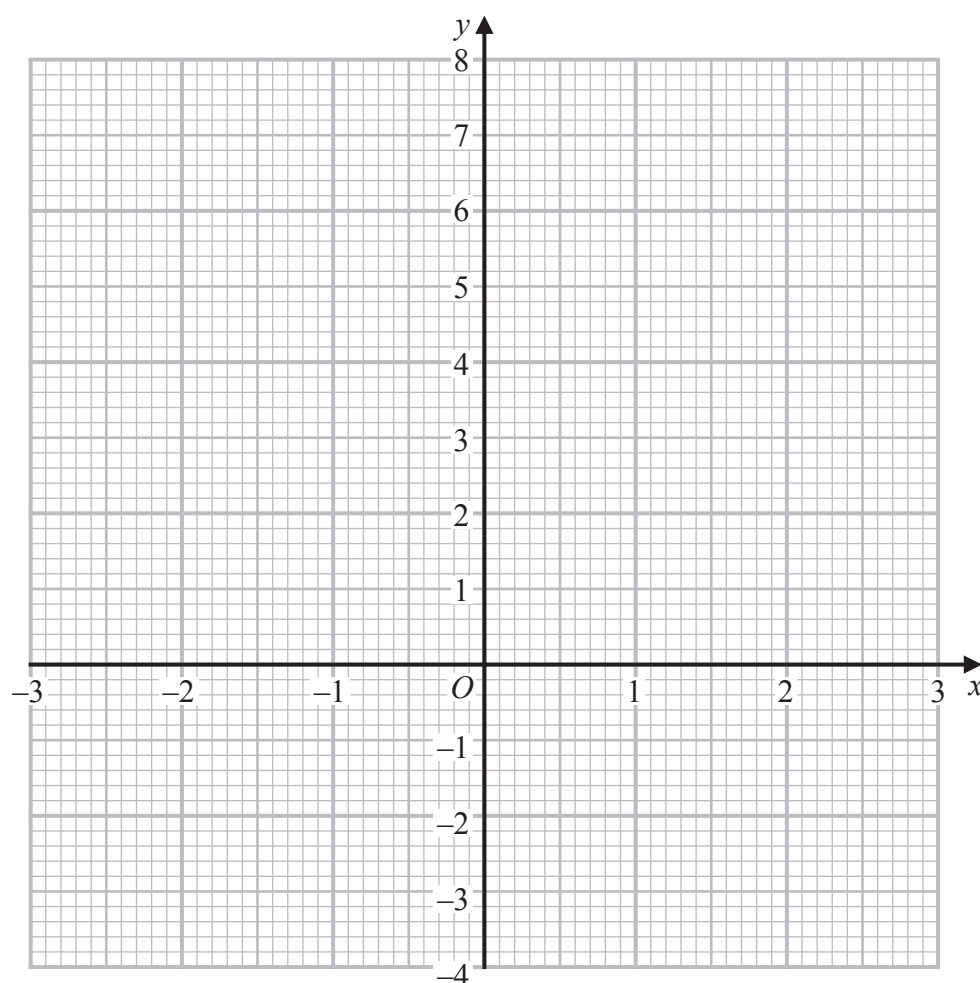
9

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

x	-3	-2	-1	0	1	2	3
y	7.5				-2.5		4.5

(2)

(b) On the grid, draw the graph of $y = x^2 - \frac{x}{2} - 3$ for values of x from -3 to 3



(2)

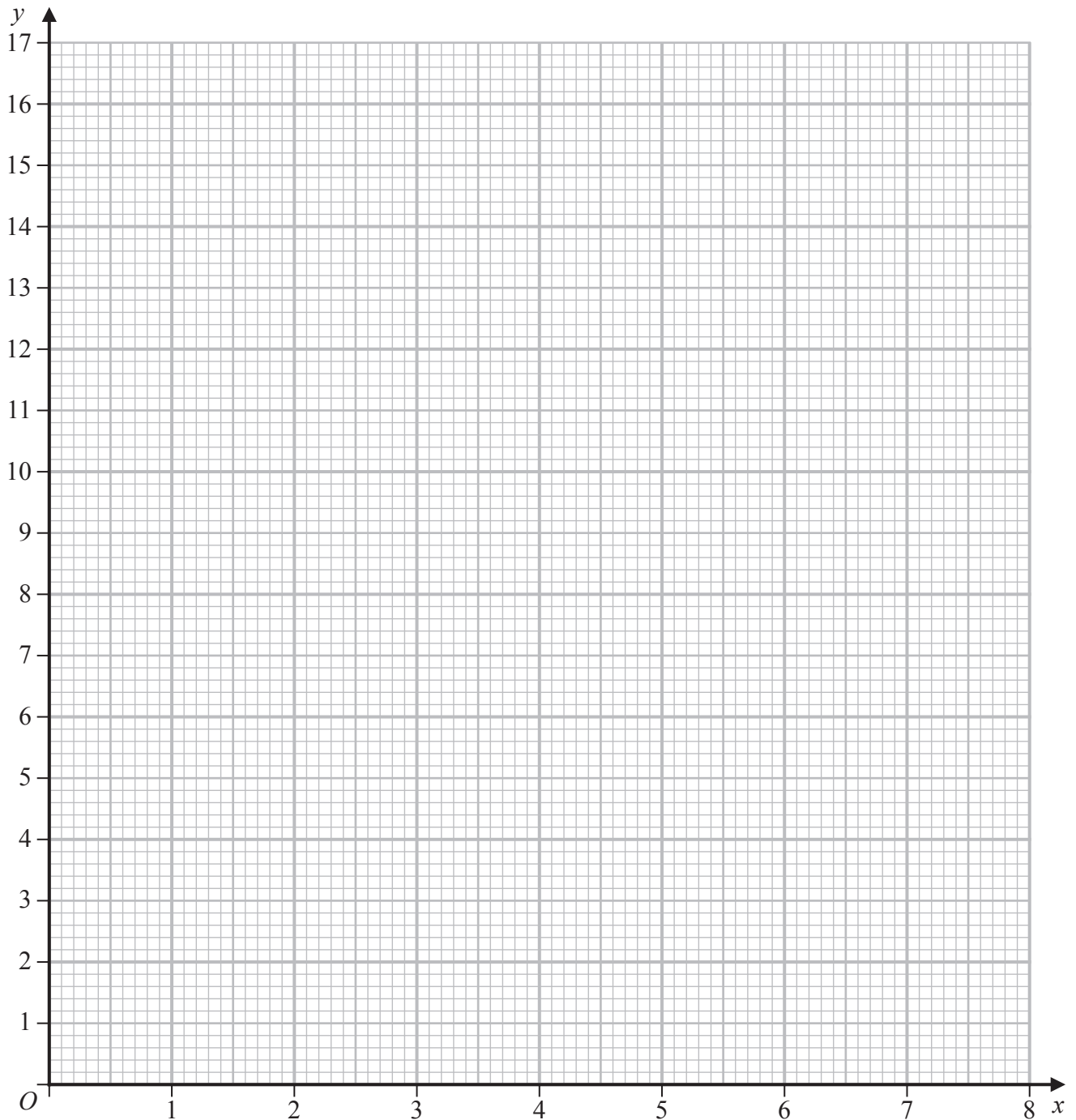
(Total for Question 9 is 4 marks)

10 (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

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

(2)

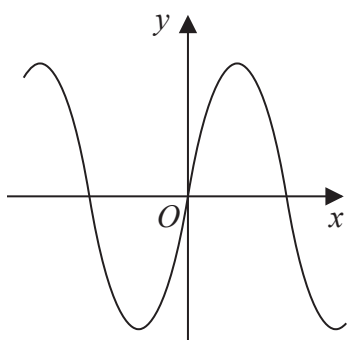


(2)

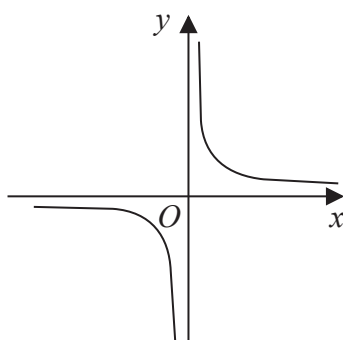
(Total for Question 10 is 4 marks)

11 Here are nine graphs.

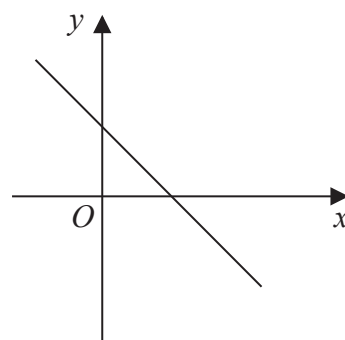
Graph A



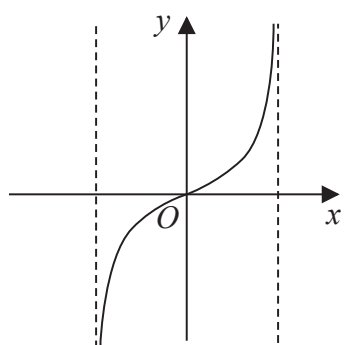
Graph B



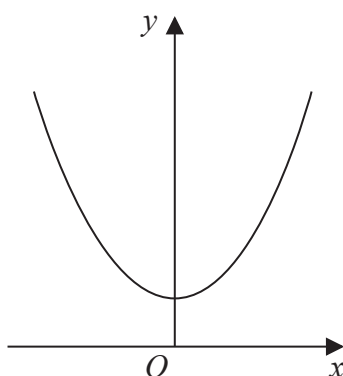
Graph C



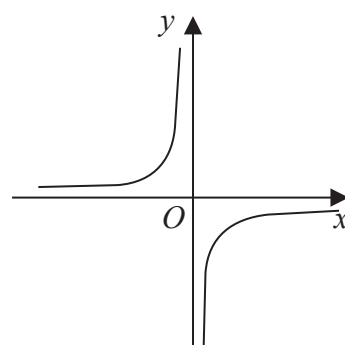
Graph D



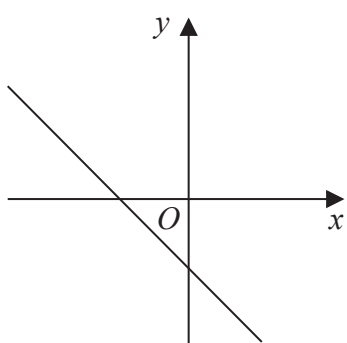
Graph E



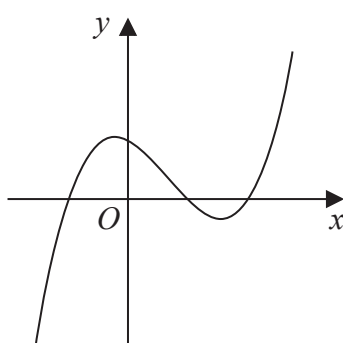
Graph F



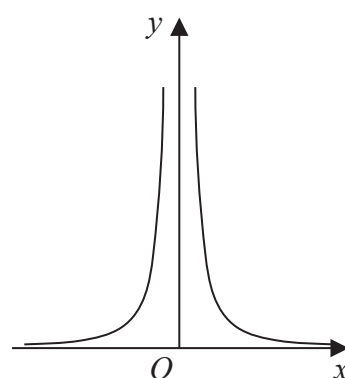
Graph G



Graph H



Graph I

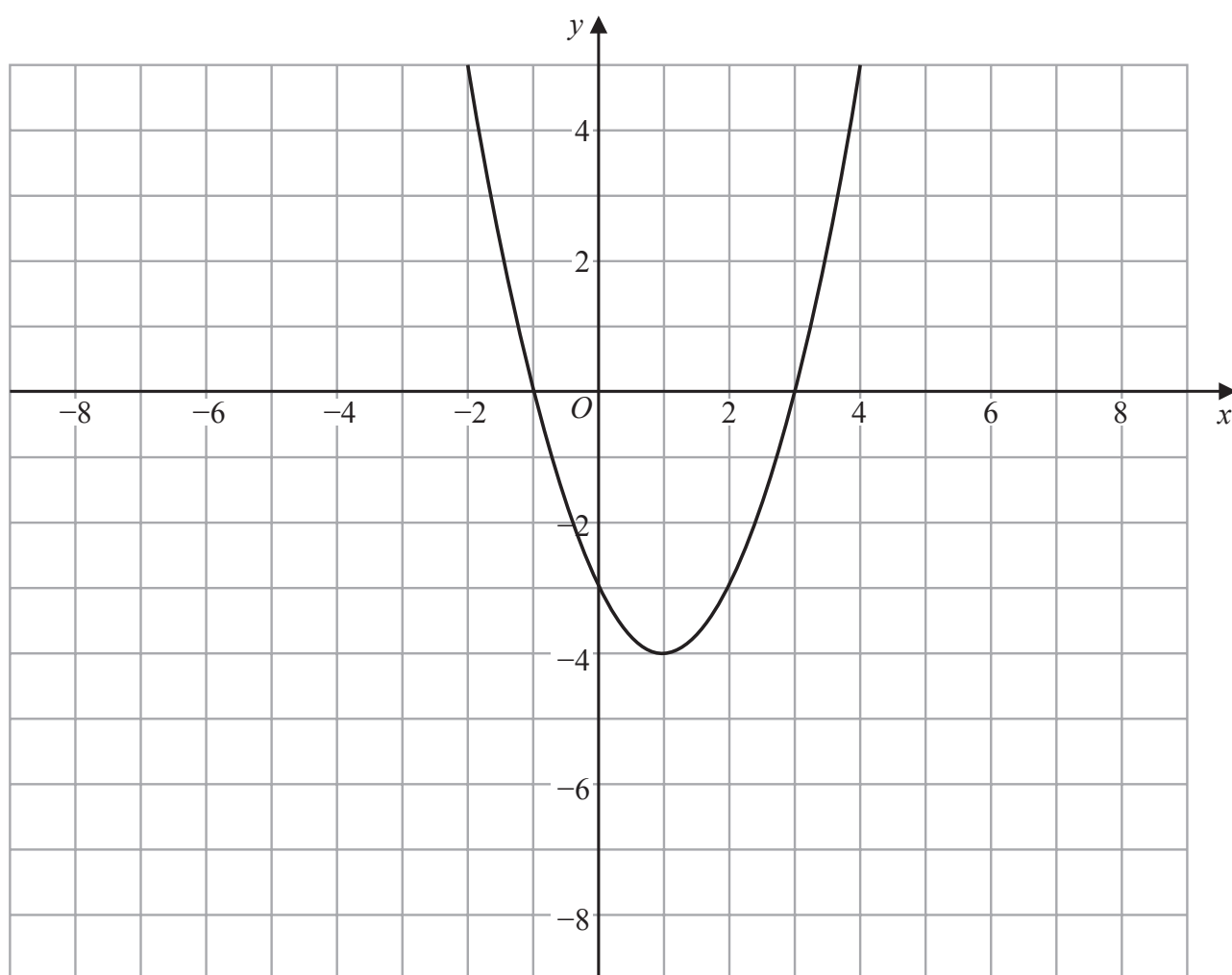


Complete the table below with the letter of the graph that could represent each given equation.
Write each answer on the dotted line.

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

(Total for Question 11 is 3 marks)

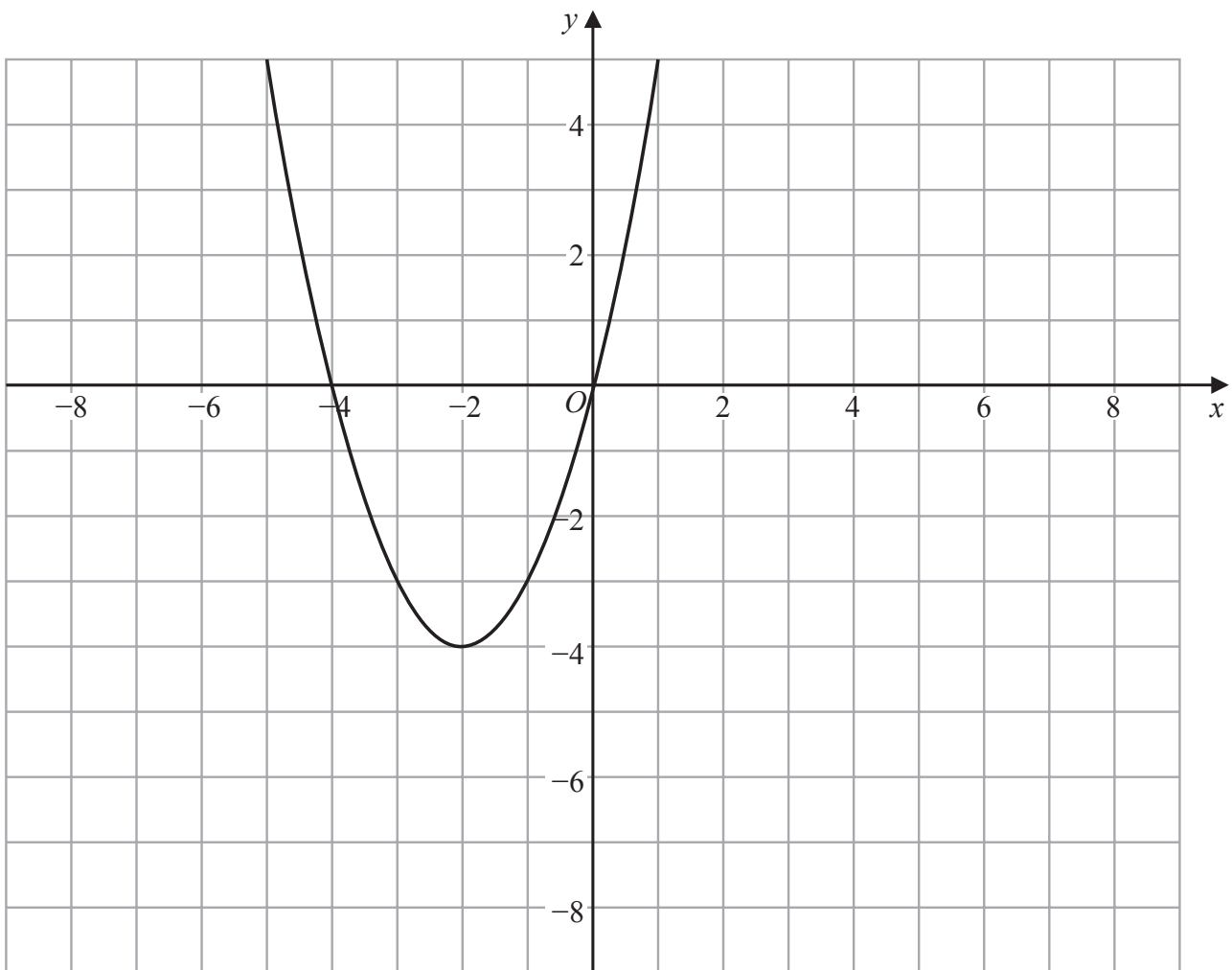
12 The graph of $y = f(x)$ is shown on the grid.



(a) On the grid above, sketch the graph of $y = f\left(\frac{1}{2}x\right)$

(2)

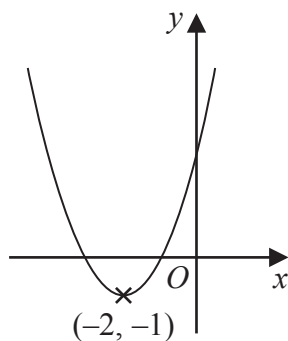
The graph of $y = f(x + k)$ is shown on the grid below.



(b) Write down the value of k

(1)

(Total for Question 12 is 3 marks)



The diagram shows the curve with equation $y = f(x)$

The coordinates of the minimum point of the curve are $(-2, -1)$

(a) Write down the coordinates of the minimum point of the curve with equation

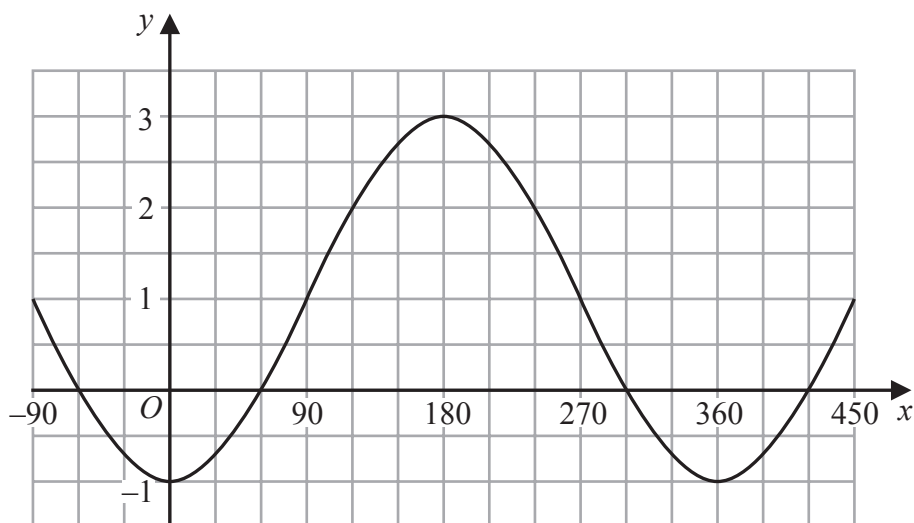
(i) $y = f(x - 5)$

(.....,)

(ii) $y = \frac{1}{2}f(x)$

(.....,)
(2)

The graph of $y = a \sin(x - b)^\circ + c$ for $-90 \leq x \leq 450$ is drawn on the grid below.



(b) Find the value of a , the value of b and the value of c .

$a =$

$b =$

$c =$

(3)

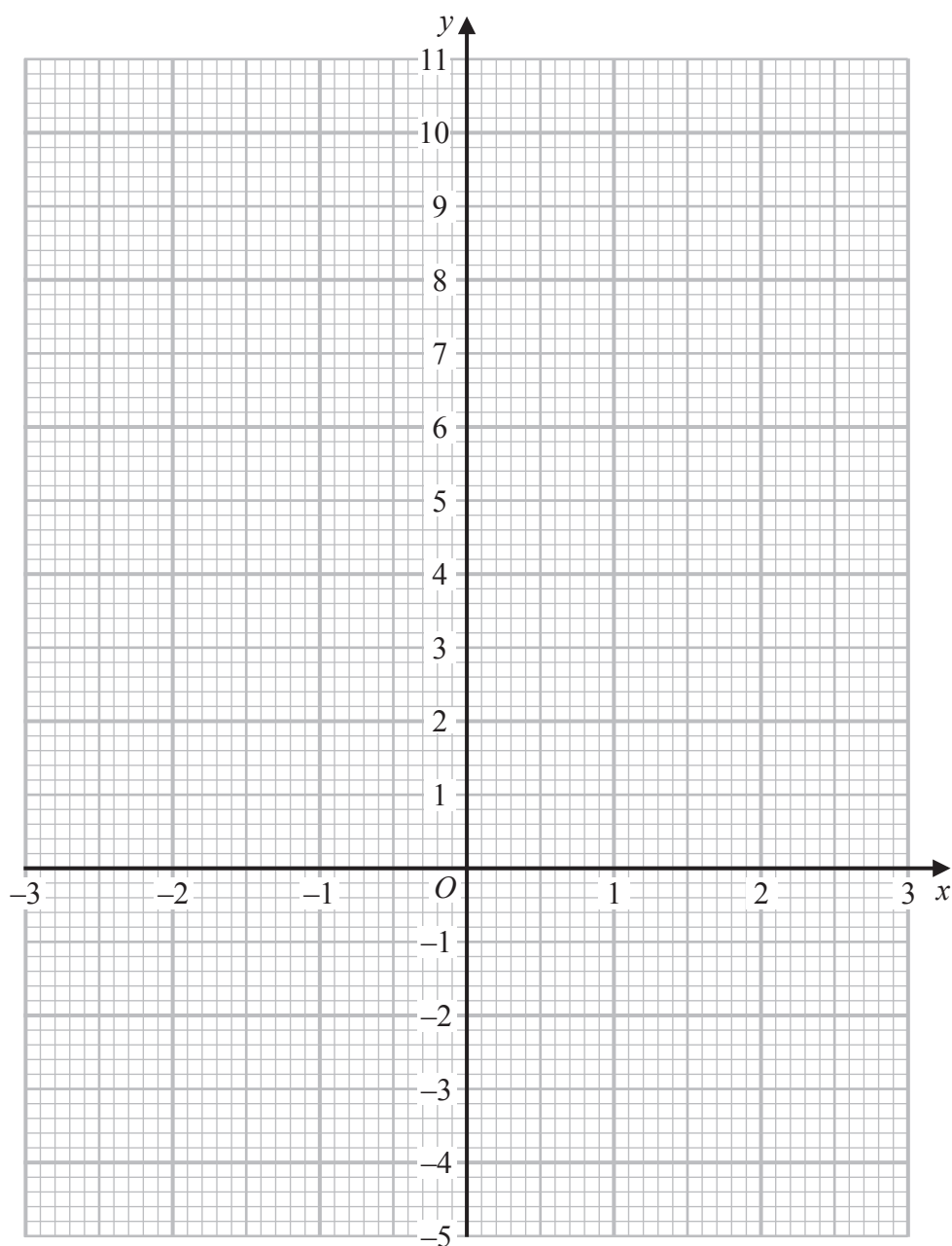
(Total for Question 13 is 5 marks)

(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 $-3 \leq x \leq 3$



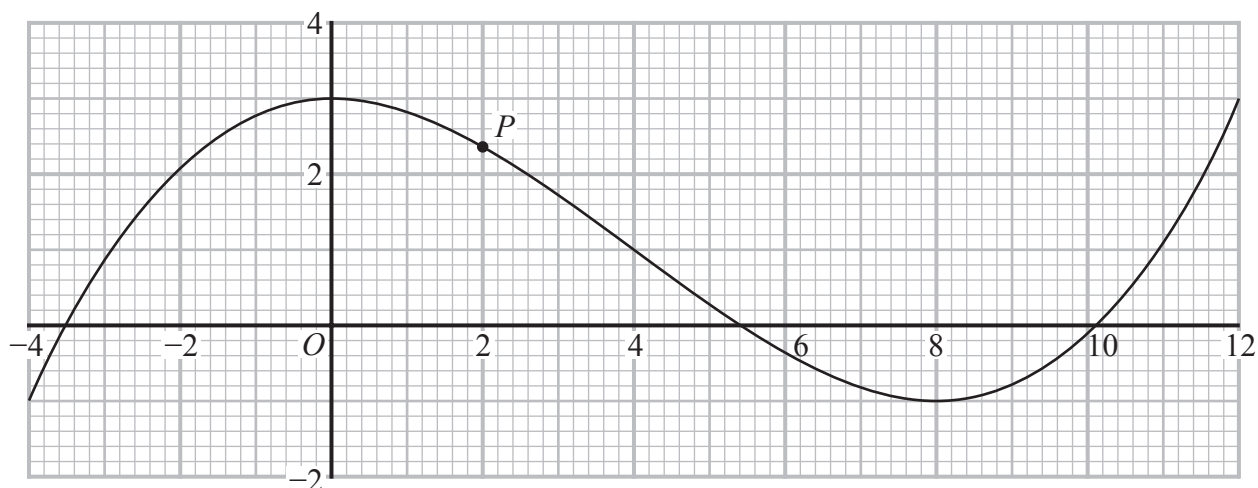
(2)

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

$x = \dots\dots\dots$
(2)

(Total for Question 14 is 6 marks)

15 The diagram shows the graph of $f(x)$ for $-4 \leq x \leq 12$



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 $-4 \leq x \leq 12$

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

..... ,
(2)

(Total for Question 15 is 7 marks)

16 The curve with equation $y = f(x)$ has one turning point.

The coordinates of this turning point are $(-6, -4)$

(a) Write down the coordinates of the turning point on the curve with equation

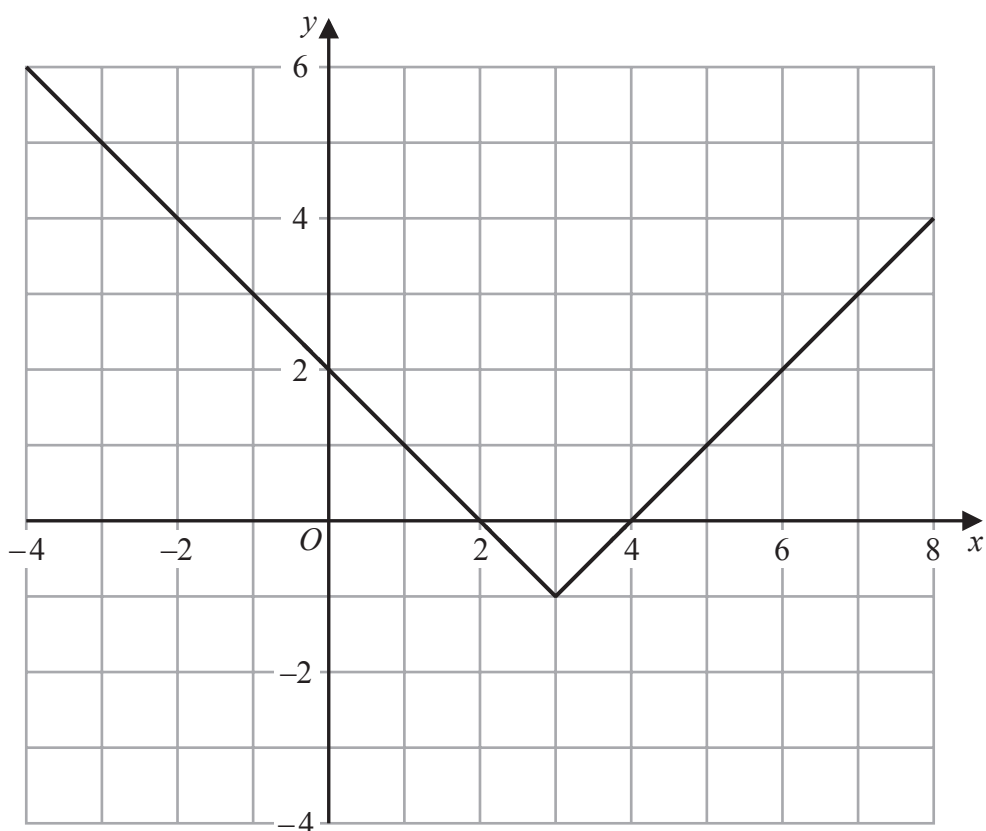
(i) $y = f(x) + 5$

(.....,)

(ii) $y = f(3x)$

(.....,)
(2)

The graph of $y = g(x)$ is shown on the grid below.



(b) On the grid, sketch the graph of $y = 2g(x)$ for $-1 \leq x \leq 7$

(2)

The graph of $y = h(x)$ intersects the x -axis at two points.
The coordinates of the two points are $(-1, 0)$ and $(6, 0)$

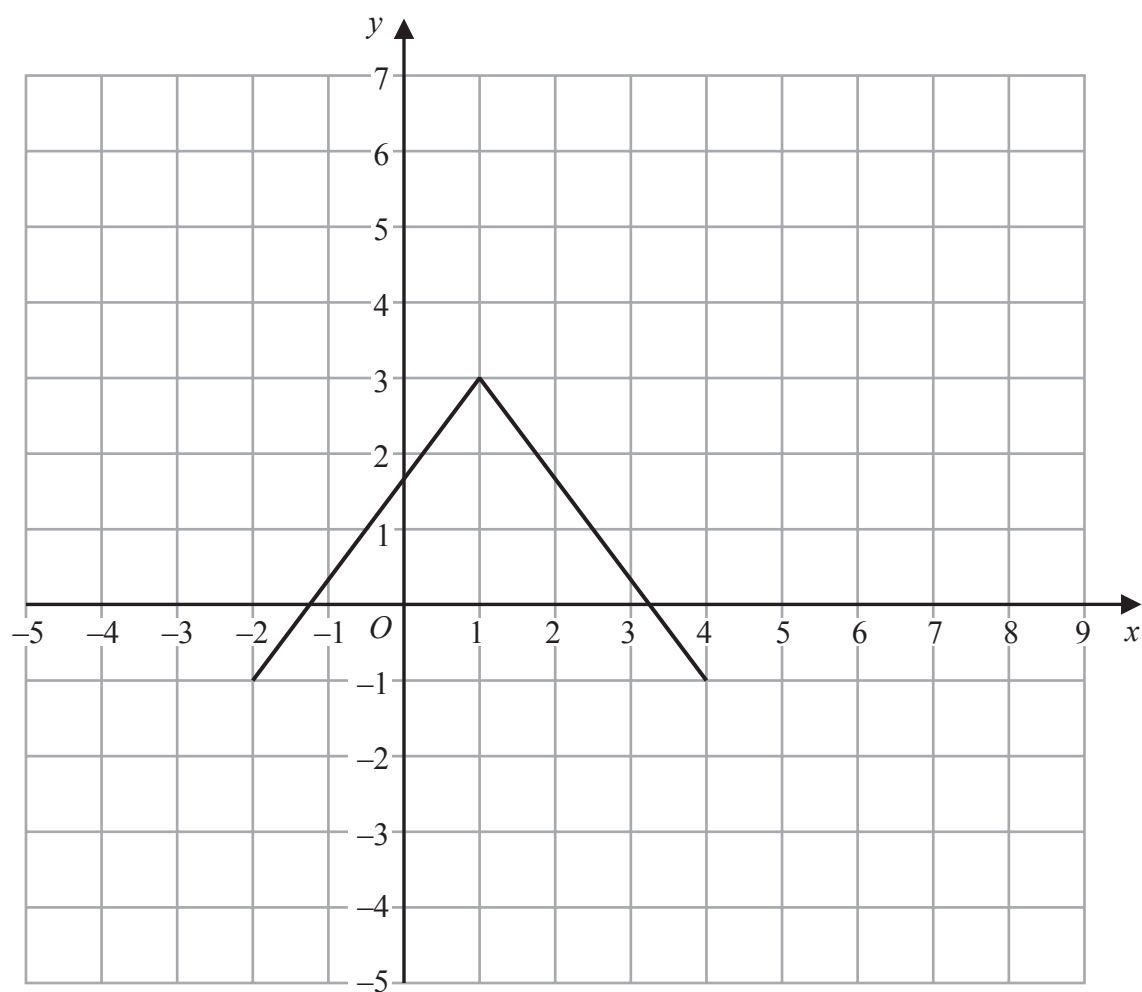
The graph of $y = h(x + a)$ passes through the point with coordinates $(2, 0)$, where a is a constant.

(c) Find the two possible values of a

..... ,
(2)

(Total for Question 16 is 6 marks)

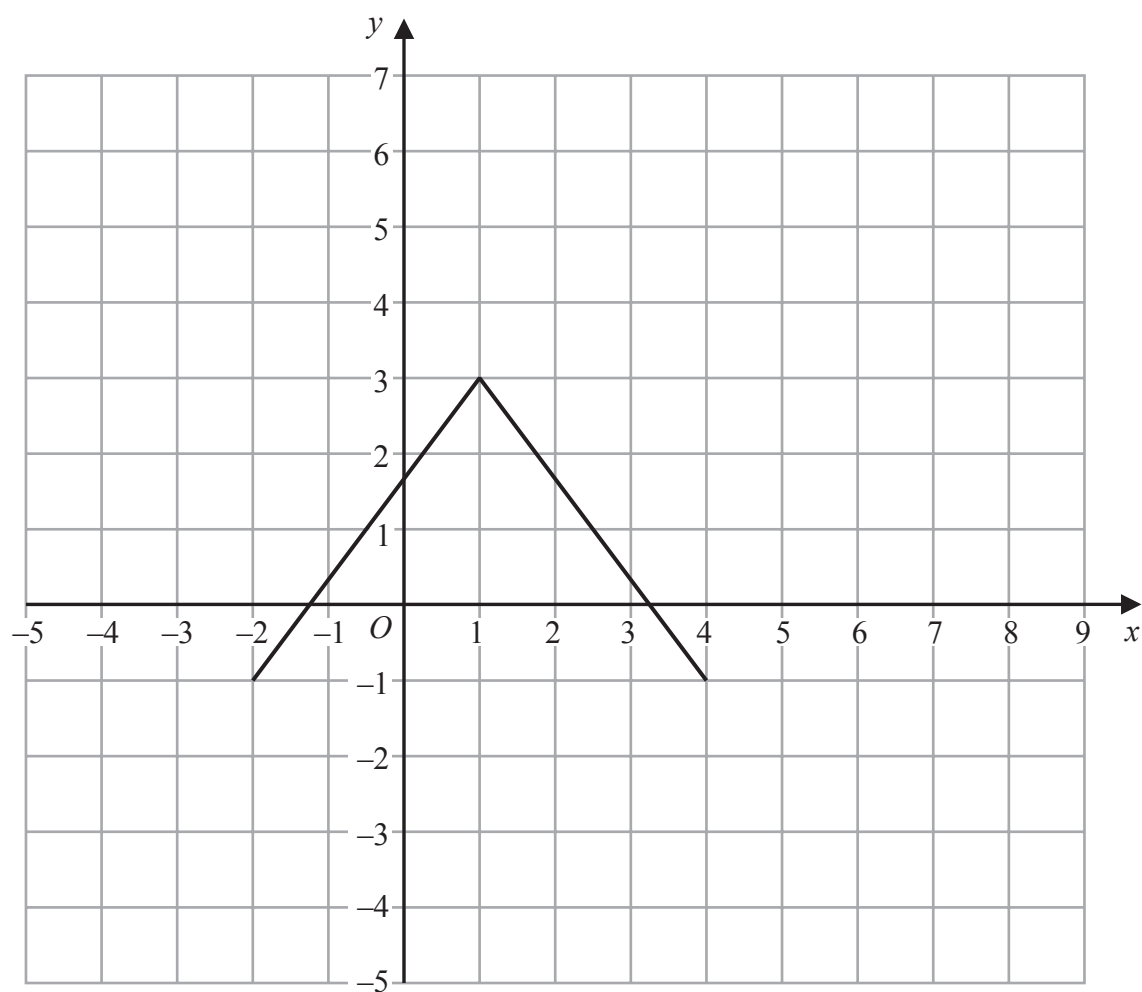
17 Here is the graph of $y = f(x)$



(a) On the grid above, draw the graph of $y = 2f(x)$

(2)

Here is the graph of $y = f(x)$

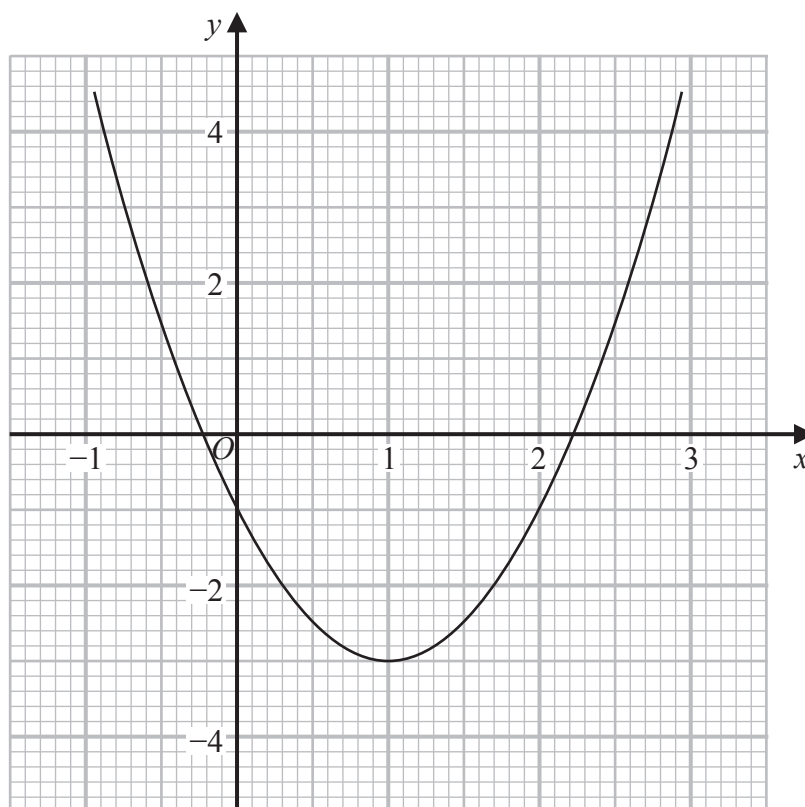


(b) On the grid above, draw the graph of $y = f(-x)$

(2)

(Total for Question 17 is 4 marks)

18 Part of the graph of $y = 2x^2 - 4x - 1$ is shown on the grid.



- (a) Use the graph to find estimates for the solutions of the equation $2x^2 - 4x - 1 = 0$.
Give your solutions correct to one decimal place.

.....
(2)

- (b) By drawing a suitable straight line on the grid, find estimates for the solutions of the equation $x^2 - x - 1 = 0$.
Show your working clearly.
Give your solutions correct to one decimal place.

.....
(3)

(Total for Question 18 is 5 marks)

- 19** The curve **C** has equation $y = f(x)$ where $f(x) = 9 - 3(x + 2)^2$
The point *A* is the maximum point on **C**.

(a) Write down the coordinates of *A*.

(..... ,)
(1)

The curve **C** is transformed to the curve **S** by a translation of $\begin{pmatrix} 4 \\ 0 \end{pmatrix}$

(b) Find an equation for the curve **S**.

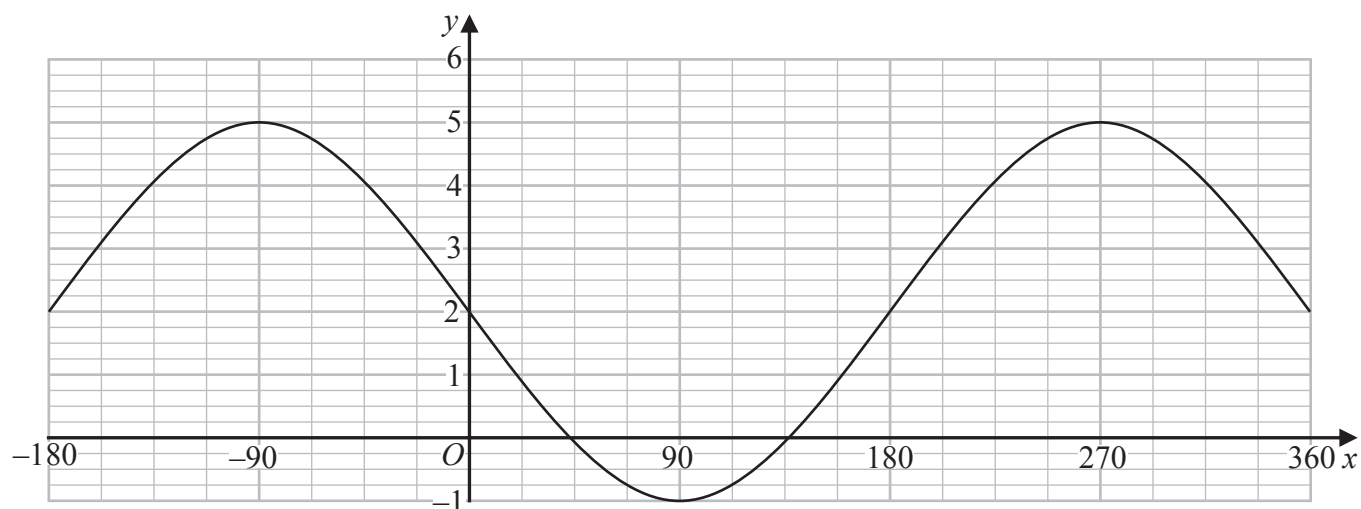
.....
(1)

The curve **C** is transformed to the curve **T**.
The curve **T** has equation $y = 3(x + 2)^2 - 9$

(c) Describe fully the transformation that maps curve **C** onto curve **T**.

.....
(1)

The graph of $y = a \cos (x - b)^\circ + c$ for $-180 \leq x \leq 360$ is drawn on the grid below.



(d) Find the value of a , the value of b and the value of c .

$a =$

$b =$

$c =$

(3)

(Total for Question 19 is 6 marks)

20 A curve has equation $y = f(x)$

The coordinates of the minimum point on this curve are $(-9, 15)$

(a) Write down the coordinates of the minimum point on the curve with equation

(i) $y = f(x + 3)$

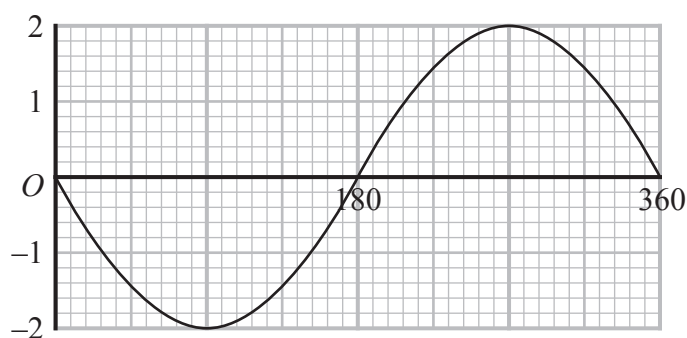
(..... ,)

(ii) $y = \frac{1}{3}f(x)$

(..... ,)

(2)

The graph of $y = a \cos(x + b)^\circ$ for $0 \leq x \leq 360$ is drawn on the grid below.



Given that $a > 0$ and that $0 < b < 360$

(b) find the value of a and the value of b .

$a =$

$b =$

(2)

(Total for Question 20 is 4 marks)

21 A curve has equation $y = f(x)$

There is only one maximum point on the curve.
The coordinates of this maximum point are $(4, 3)$

(a) Write down the coordinates of the maximum point on the curve with equation

(i) $y = f(x - 5)$

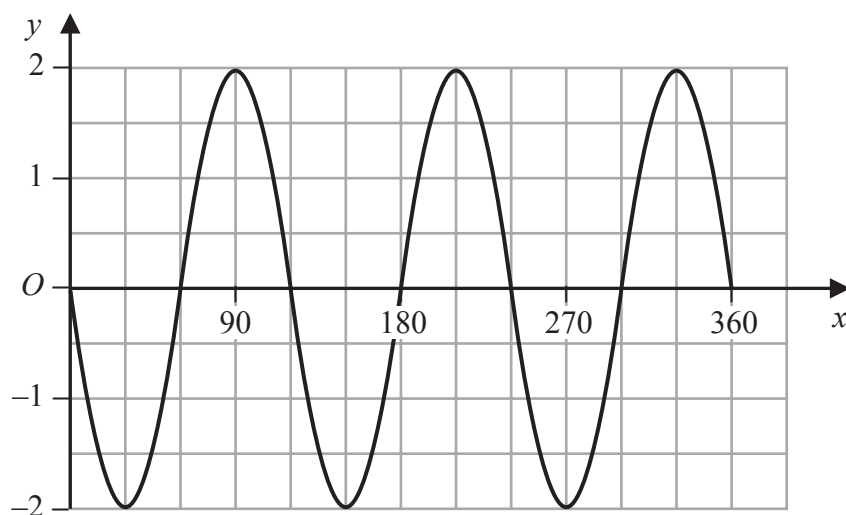
(..... ,)

(ii) $y = 3f(x)$

(..... ,)

(2)

Here is the graph of $y = a \sin(bx)^\circ$ for $0 \leq x \leq 360$



(b) Find the value of a and the value of b .

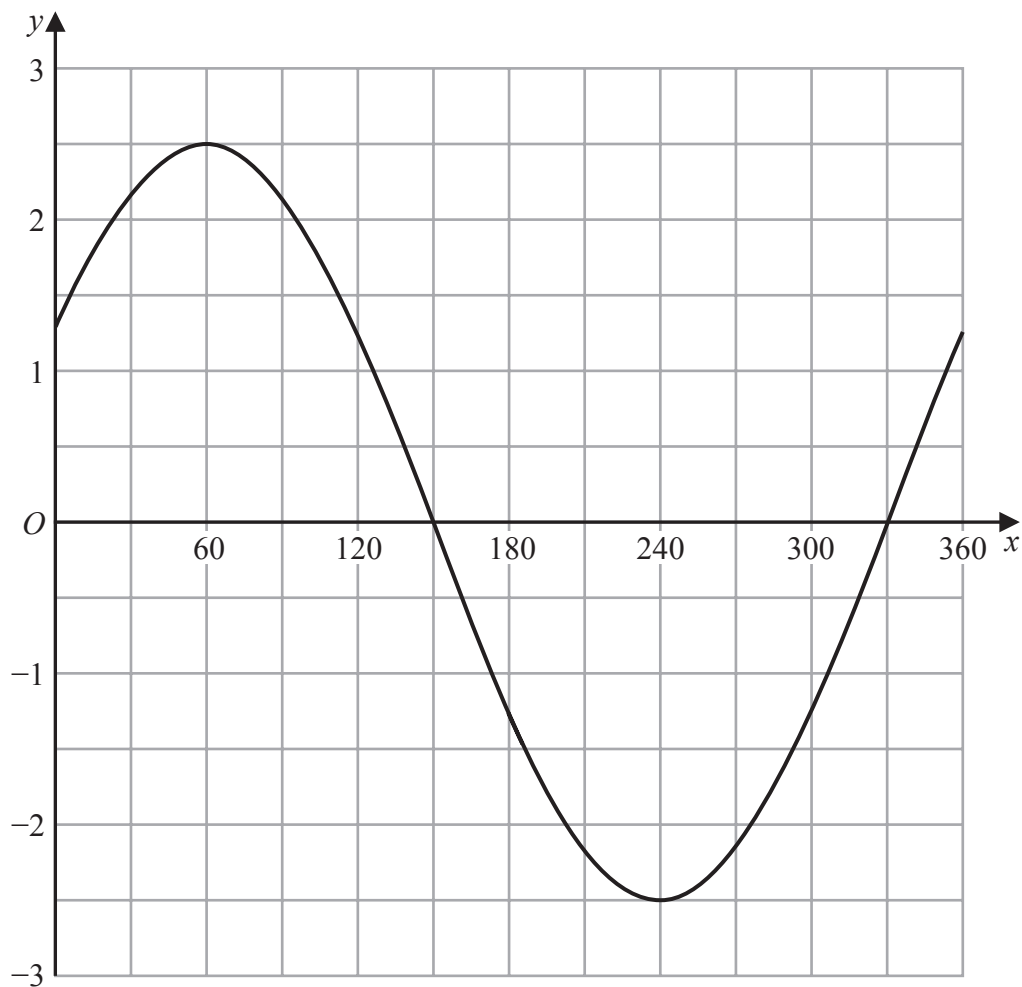
$a =$

$b =$

(2)

(Total for Question 21 is 4 marks)

22 The graph of $y = a \cos(x + b)^\circ$ for $0 \leq x \leq 360$ is drawn on the grid.



(a) Find the value of a and the value of b .

$a = \dots\dots\dots$

$b = \dots\dots\dots$

(2)

Another curve C has equation $y = f(x)$

The coordinates of the minimum point of C are $(4, 5)$

(b) Write down the coordinates of the minimum point of the curve with equation

(i) $y = f(2x)$

(.....,)

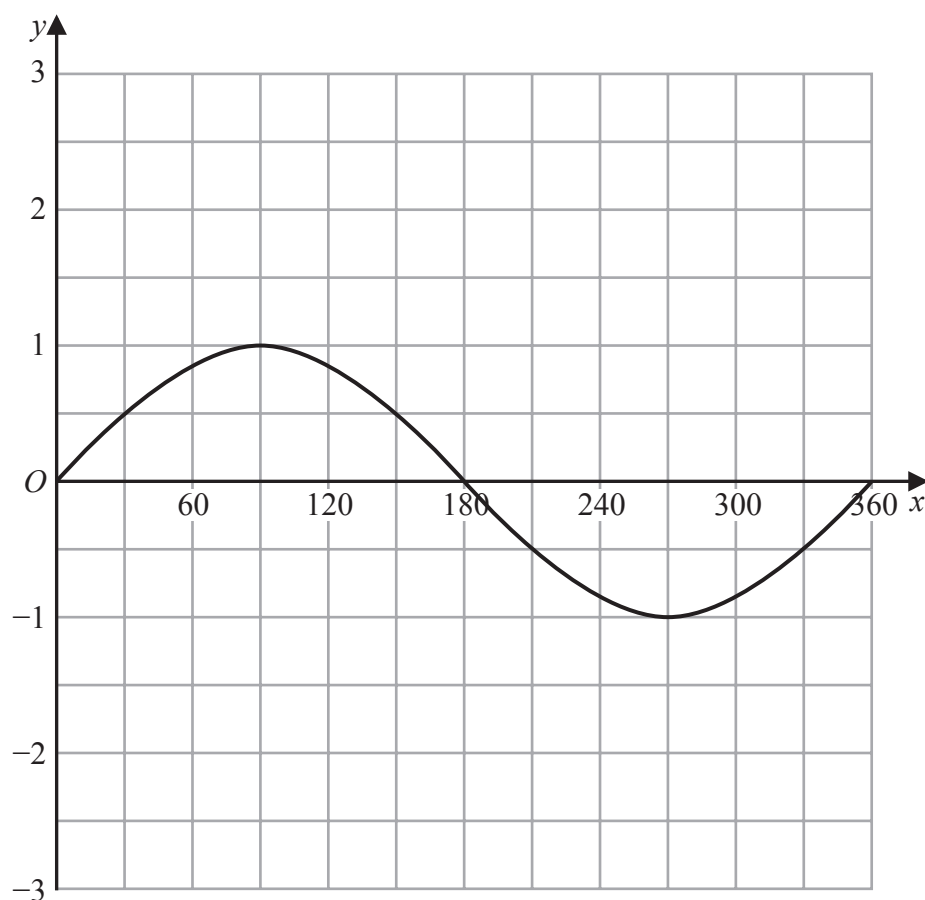
(ii) $y = f(x) - 7$

(.....,)

(2)

(Total for Question 22 is 4 marks)

23 The graph of $y = \sin x^\circ$ for $0 \leq x \leq 360$ is drawn on the grid.



(a) On the grid, draw the graph of $y = 2\sin(x + 30)^\circ$ for $0 \leq x \leq 360$

(2)

(b) (i) Write $x^2 - 6x + 10$ in the form $(x - a)^2 + b$ where a and b are integers.

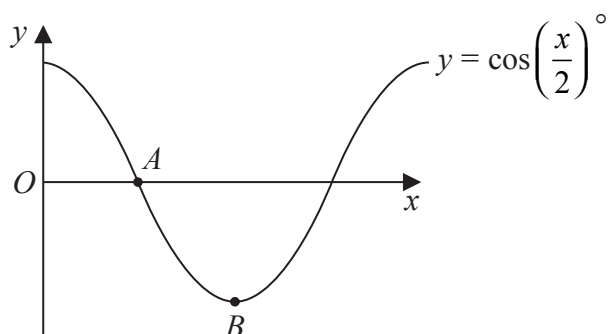
(2)

(ii) Hence, describe fully the single transformation that maps the curve with equation $y = x^2$ onto the curve with equation $y = x^2 - 6x + 10$

(2)

(Total for Question 23 is 6 marks)

The diagram shows a sketch of the graph of $y = \cos\left(\frac{x}{2}\right)^\circ$



- (i) Find the coordinates of the point A

(..... ,)
(1)

- (ii) Find the coordinates of the point B

(..... ,)
(1)

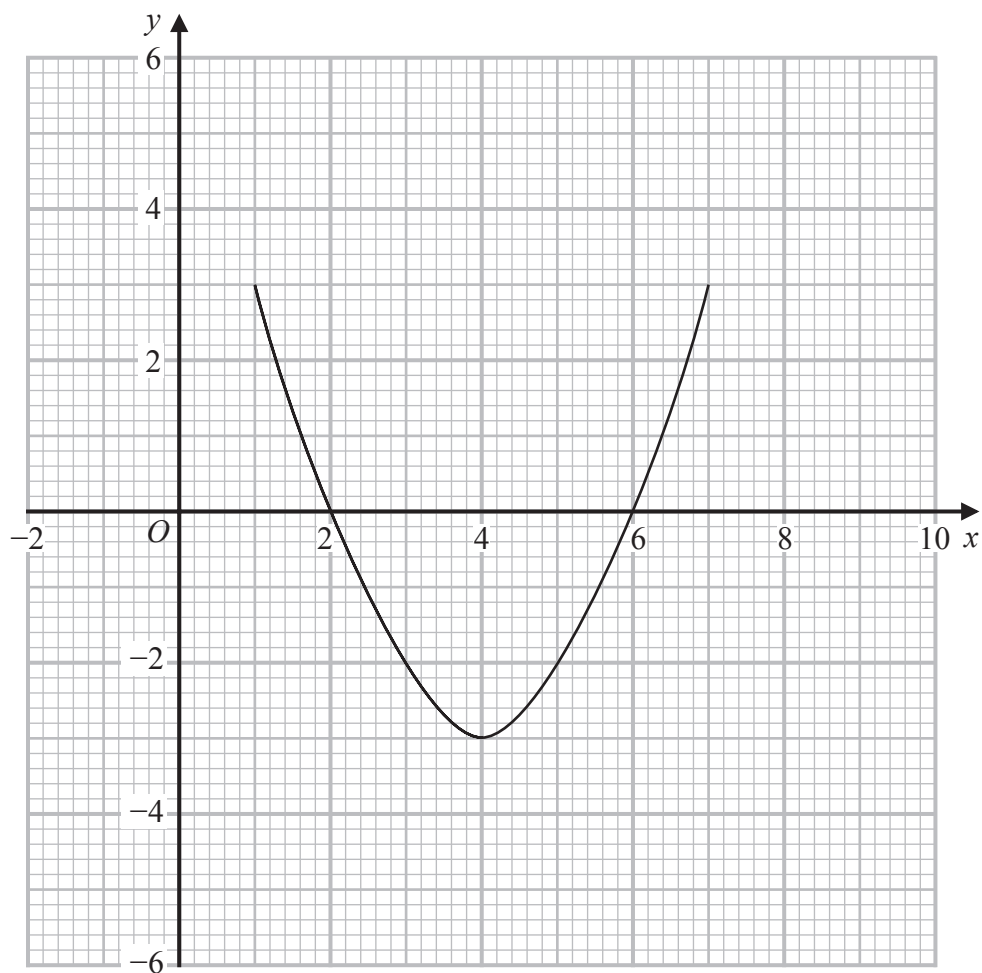
(Total for Question 24 is 2 marks)

- 25** The curve with equation $y = g(x)$ is transformed to the curve with equation $y = -g(x)$ by the single transformation **T**.

(a) Describe fully the transformation **T**.

(1)

The diagram shows the graph of $y = f(x)$



(b) On the grid, draw the graph of $y = 2f(x - 1)$

(2)

(Total for Question 25 is 3 marks)