

# Transformation of Graphs

## Question Paper 1

<b>Level</b>	IGCSE
<b>Exam Board</b>	Edexcel
<b>Subject</b>	Mathematics
<b>Topic</b>	Sequences, functions & graphs
<b>Sub-Topic</b>	Transformation of Graphs
<b>Booklet</b>	Question Paper 1

**Time Allowed:** 44 minutes

**Score:** /39

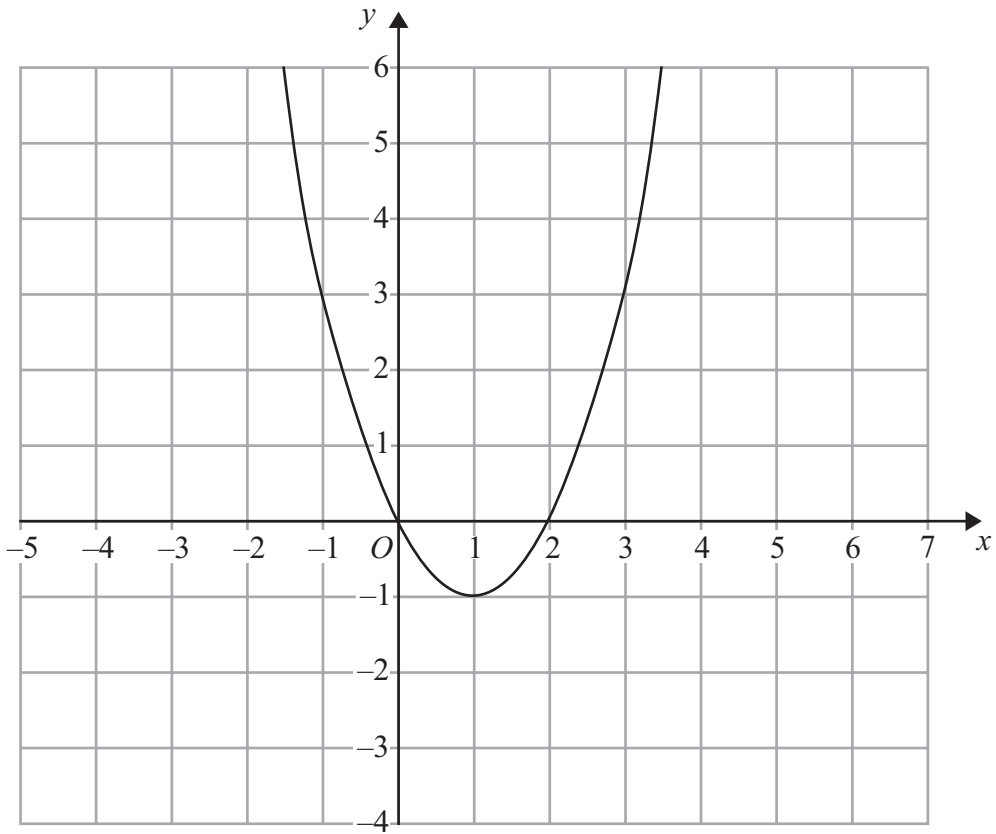
**Percentage:** /100

### Grade Boundaries:

9	8	7	6	5	4	3	2	1
>90%	80%	70%	60%	50%	40%	30%	20%	10%

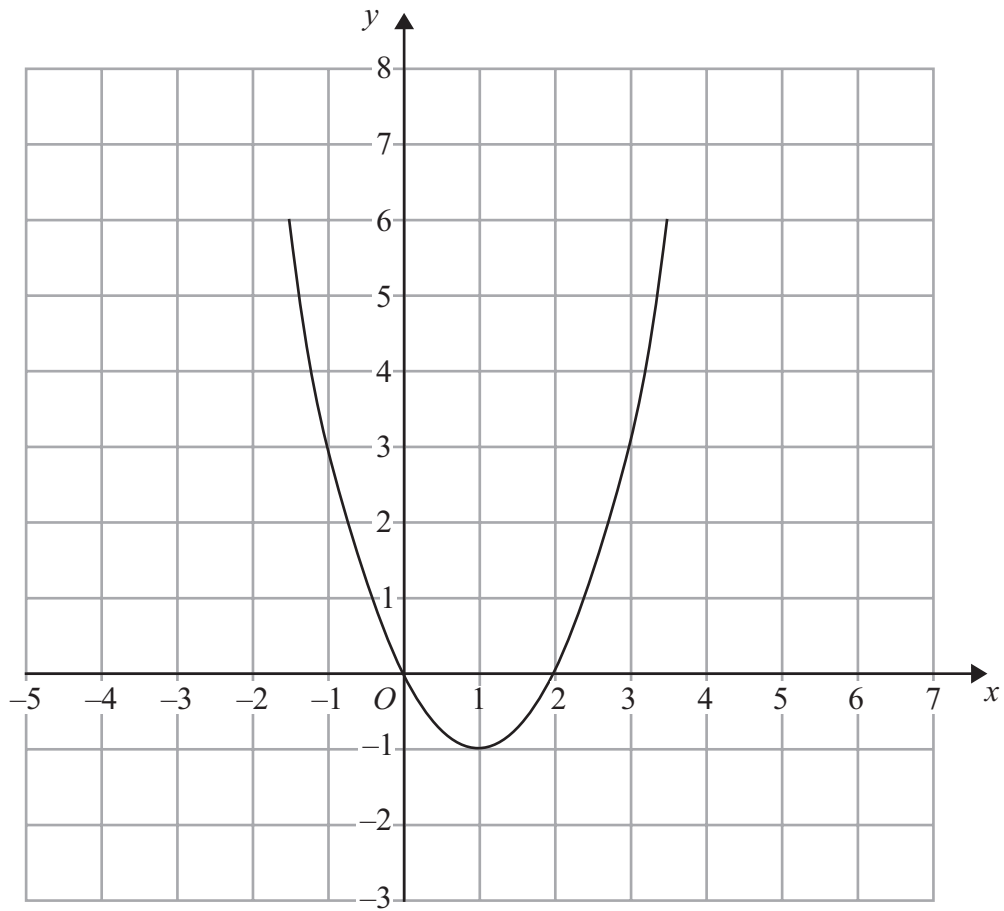
1 The graph of  $y = f(x)$  is shown on each of the grids.

(a) On this grid, sketch the graph of  $y = f(x - 3)$



(2)

(b) On this grid, sketch the graph of  $y = 2f(x)$

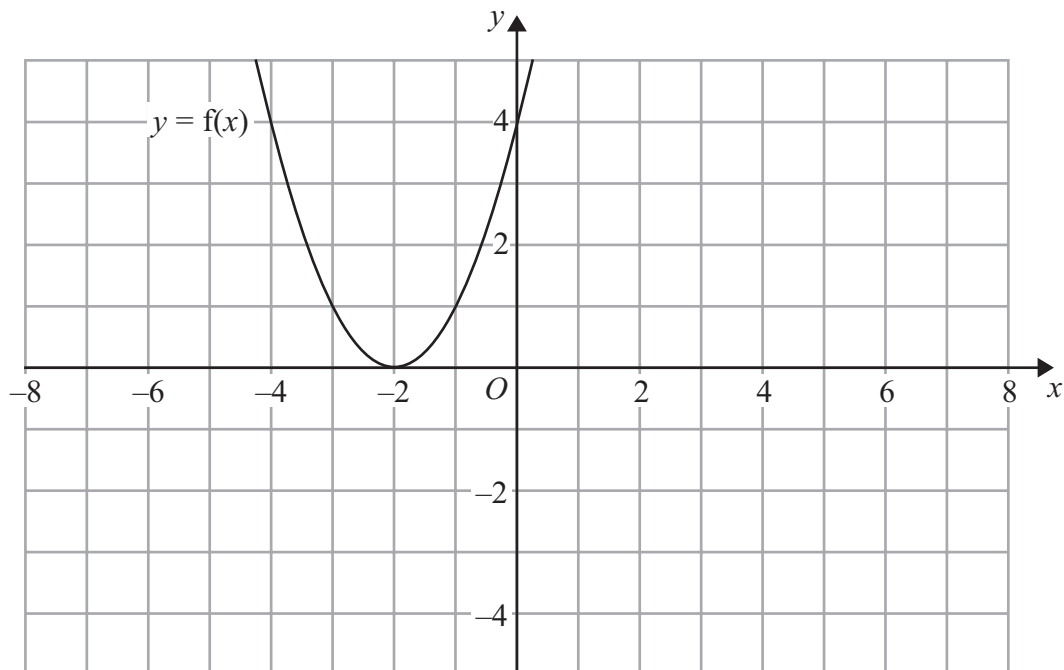


(2)

**(Total 4 marks)**

2  $y = f(x)$

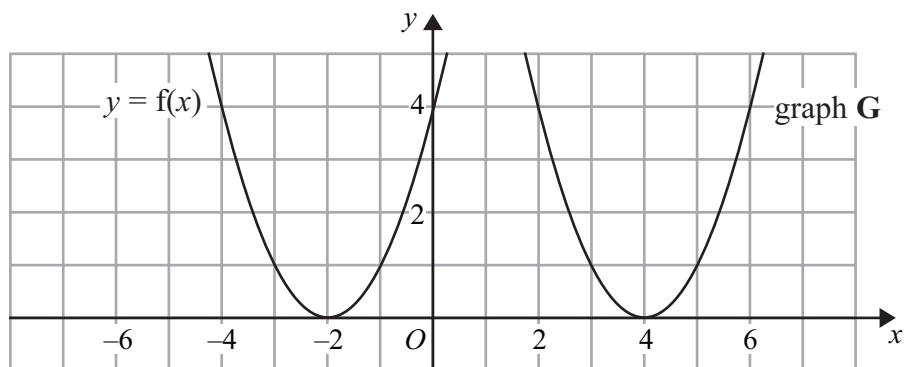
The graph of  $y = f(x)$  is shown on the grid.



(a) On the grid above, sketch the graph of  $y = -f(x)$ .

(2)

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

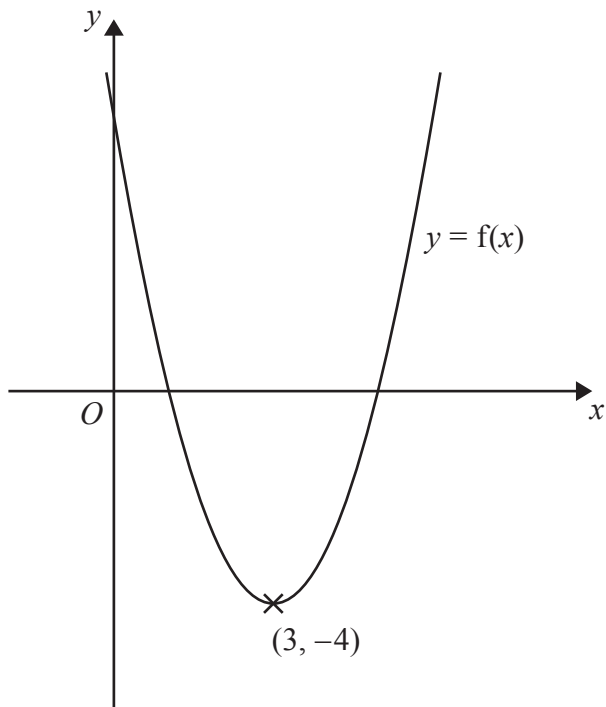


The graph **G** is a translation of the graph of  $y = f(x)$ .

(b) Write down the equation of graph **G**.

.....  
(1)

3



The diagram shows part of the curve with equation  $y = f(x)$ .  
The coordinates of the minimum point of this curve are  $(3, -4)$

Write down the coordinates of the minimum point of the curve with equation

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

(..... , .....)

(ii)  $y = f(x + 2)$

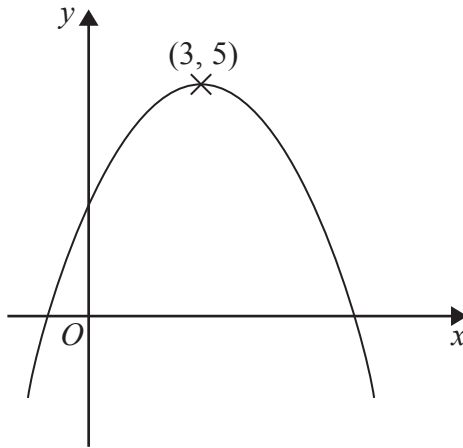
(..... , .....)

(iii)  $y = f(-x)$

(..... , .....)

**(Total 3 marks)**

4



The diagram shows part of the curve with equation  $y = f(x)$ .  
 The coordinates of the maximum point of the curve are  $(3, 5)$ .

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

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

(..... , .....)

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

(..... , .....)

(iii)  $y = f(-x)$

(..... , .....)

(3)

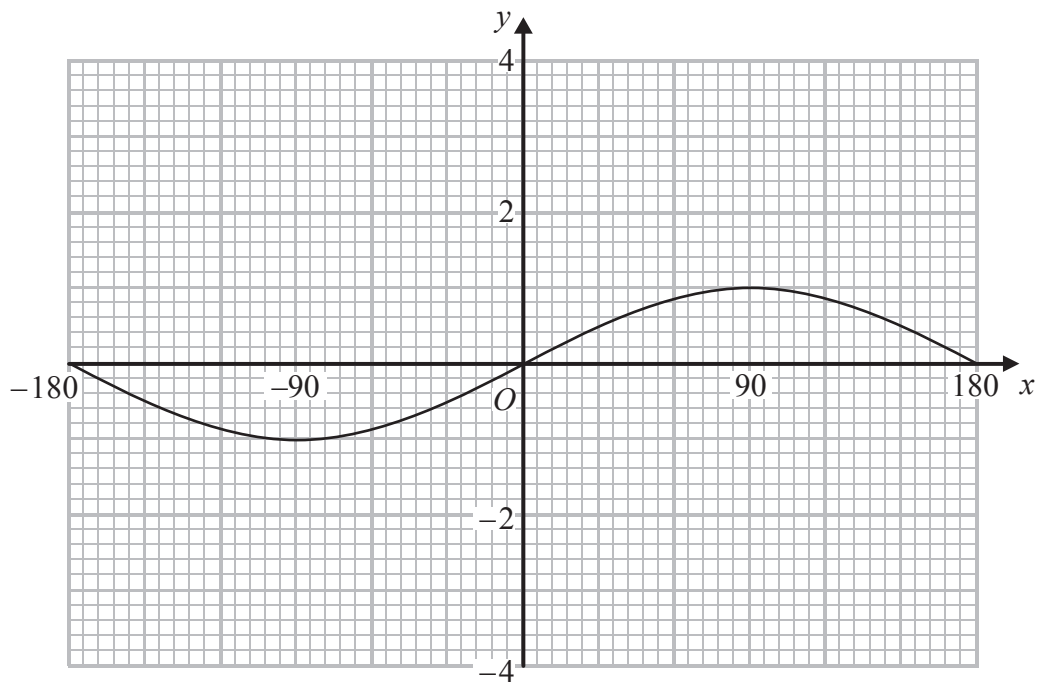
The curve with equation  $y = f(x)$  is transformed to give the curve with equation  $y = f(x) - 4$

(b) Describe the transformation.

(1)

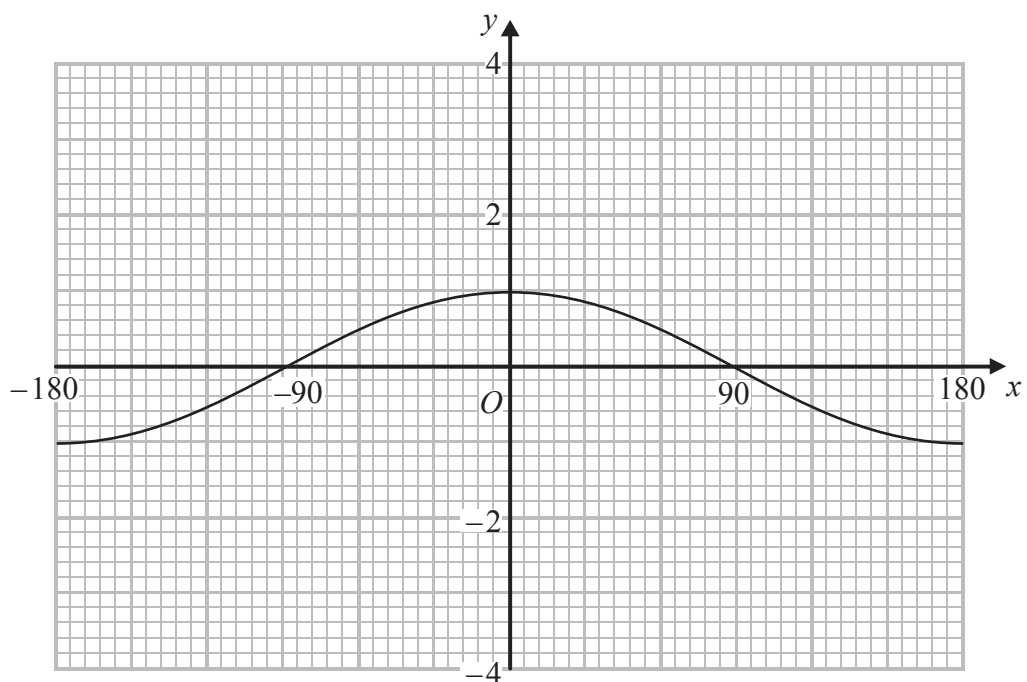
**(Total 4 marks)**

5 Here is the graph of  $y = \sin x^\circ$  for  $-180 \leq x \leq 180$



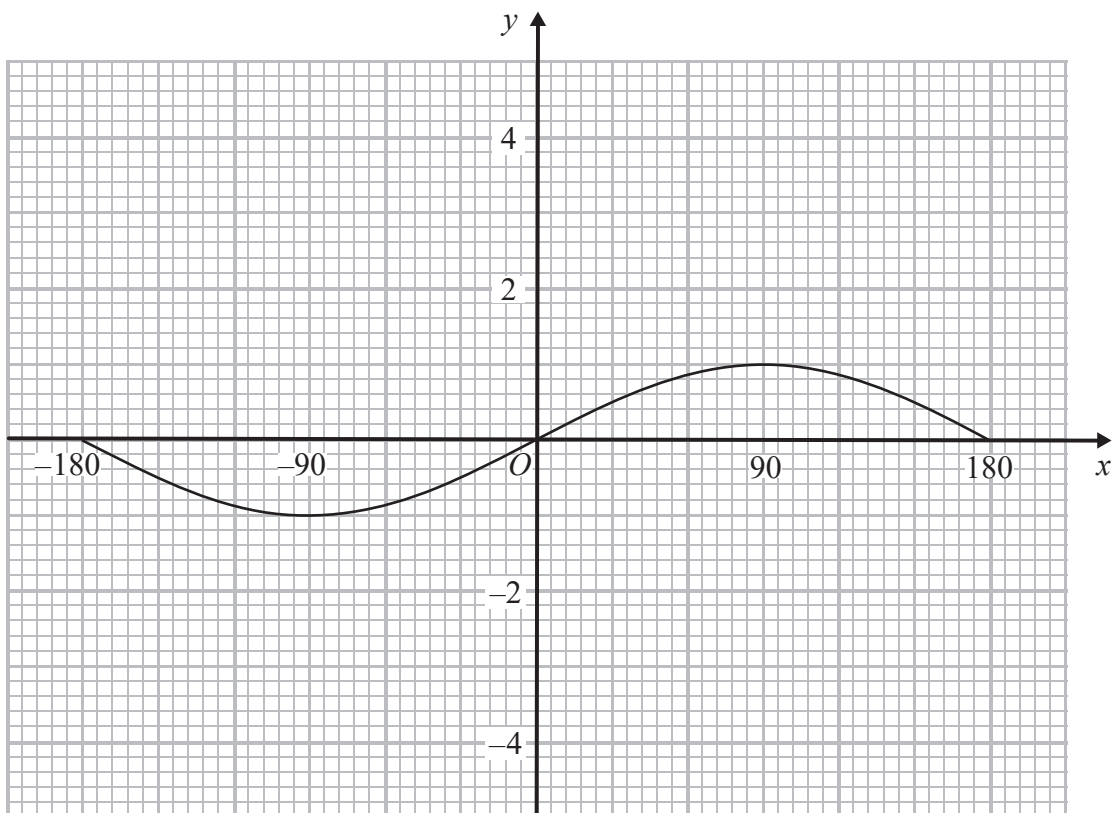
(a) On the grid above, sketch the graph of  $y = \sin x^\circ + 2$  for  $-180 \leq x \leq 180$  (2)

Here is the graph of  $y = \cos x^\circ$  for  $-180 \leq x \leq 180$



(b) On the grid above, sketch the graph of  $y = -\cos x^\circ$  for  $-180 \leq x \leq 180$  (2)

6 Here is the graph of  $y = \sin x^\circ$  for  $-180 \leq x \leq 180$

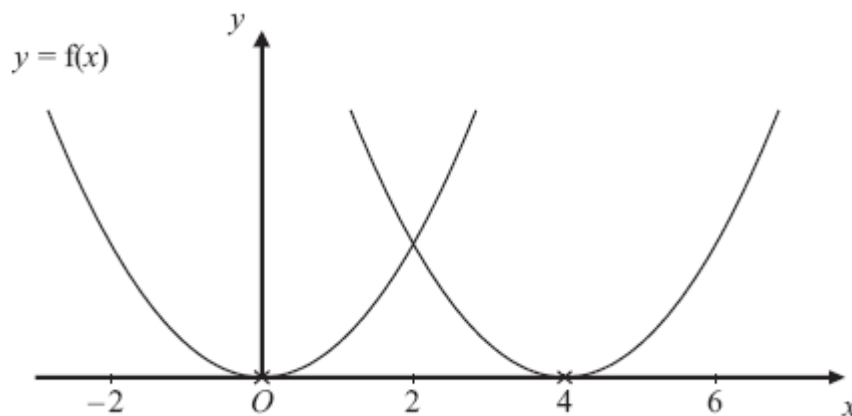


On the grid, sketch the graph of  $y = \sin x^\circ - 2$  for  $-180 \leq x \leq 180$

**(Total 2 marks)**



7



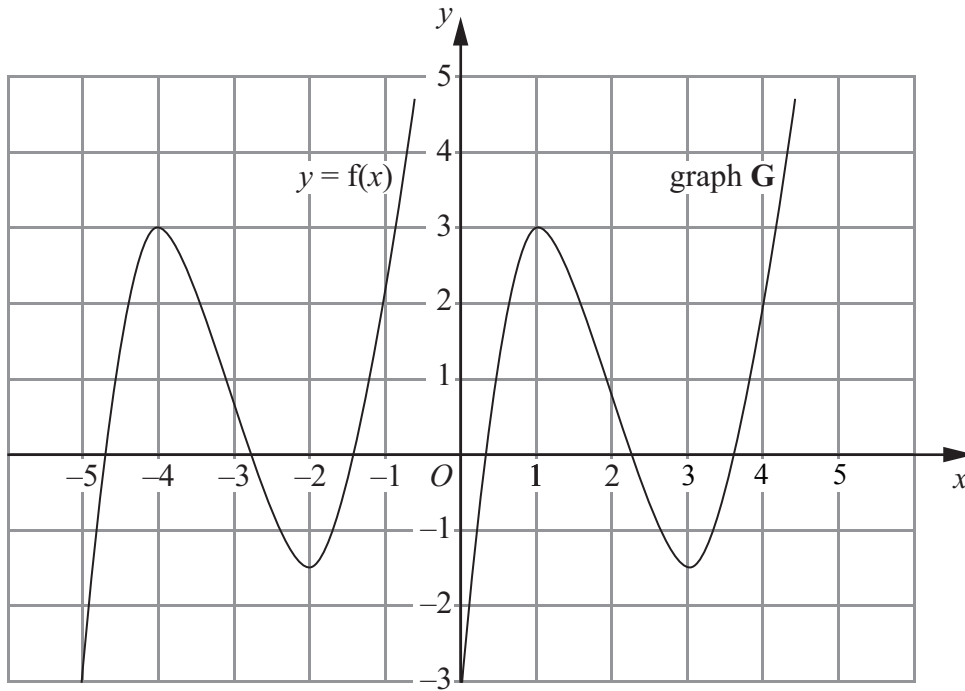
The curve with equation  $y = f(x)$  is translated so that the point at  $(0, 0)$  is mapped onto the point  $(4, 0)$ .

Find an equation of the translated curve.

.....  
(2)

(Total 2 marks)

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



The graph **G** is a translation of the graph of  $y = f(x)$ .

(a) Write down, in terms of  $f$ , the equation of graph **G**.

$y = \dots\dots\dots$   
**(1)**

The graph of  $y = f(x)$  has a maximum point at  $(-4, 3)$ .

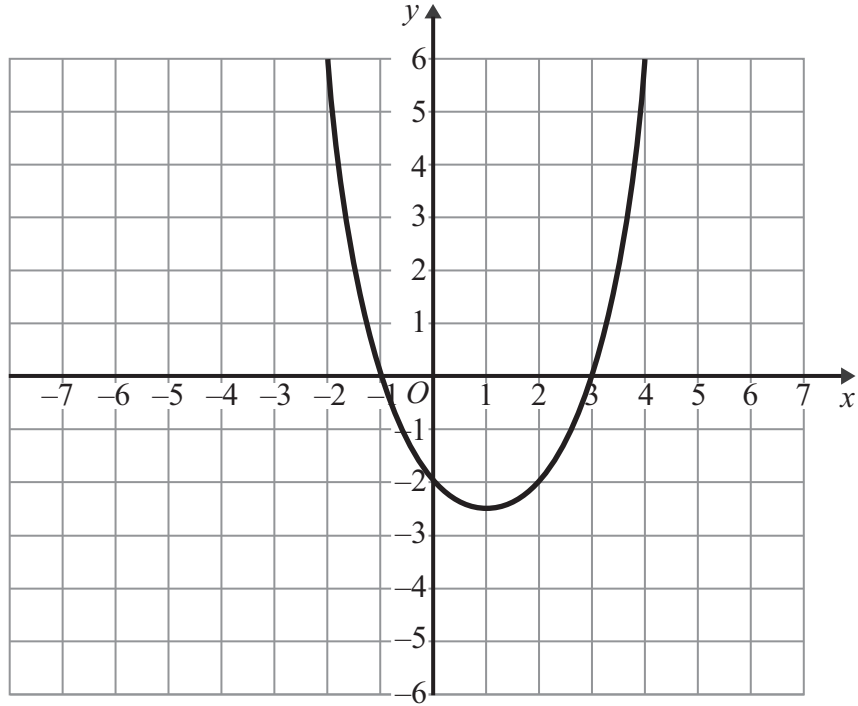
(b) Write down the coordinates of the maximum point of the graph of  $y = f(-x)$ .

$(\dots\dots\dots, \dots\dots\dots)$   
**(2)**

**(Total 3 marks)**

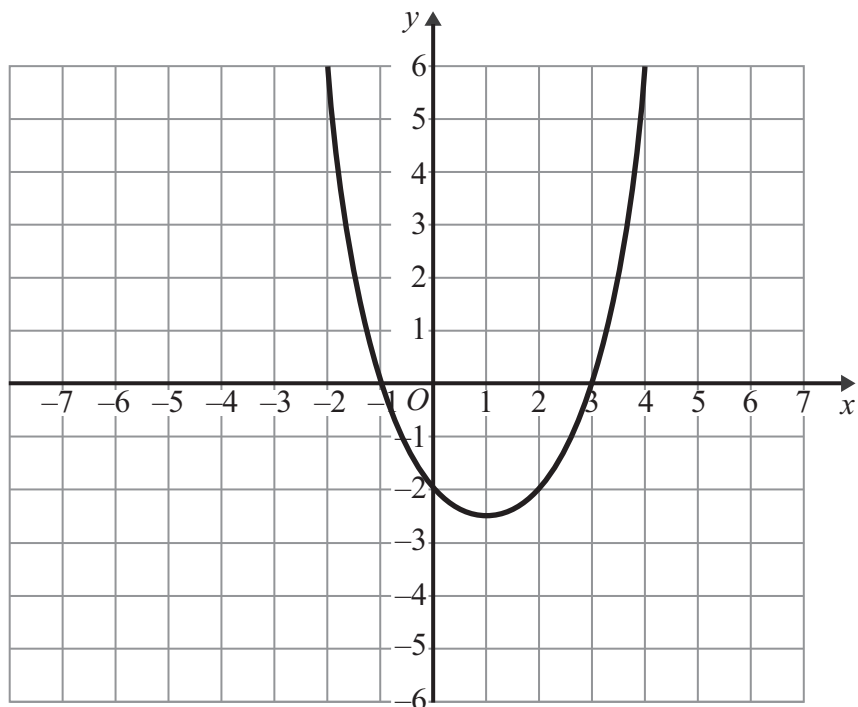
9 The graph of  $y = f(x)$  is shown on the grids.

(a) On this grid, sketch the graph of  $y = f(x - 3)$



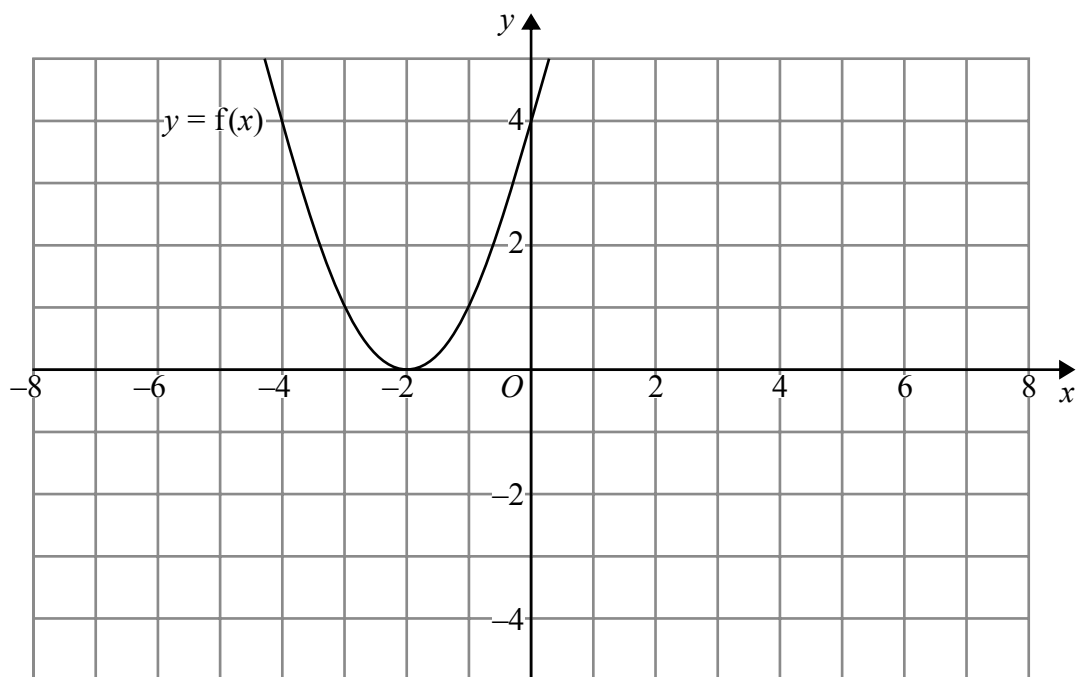
(2)

(b) On this grid, sketch the graph of  $y = -f(x)$



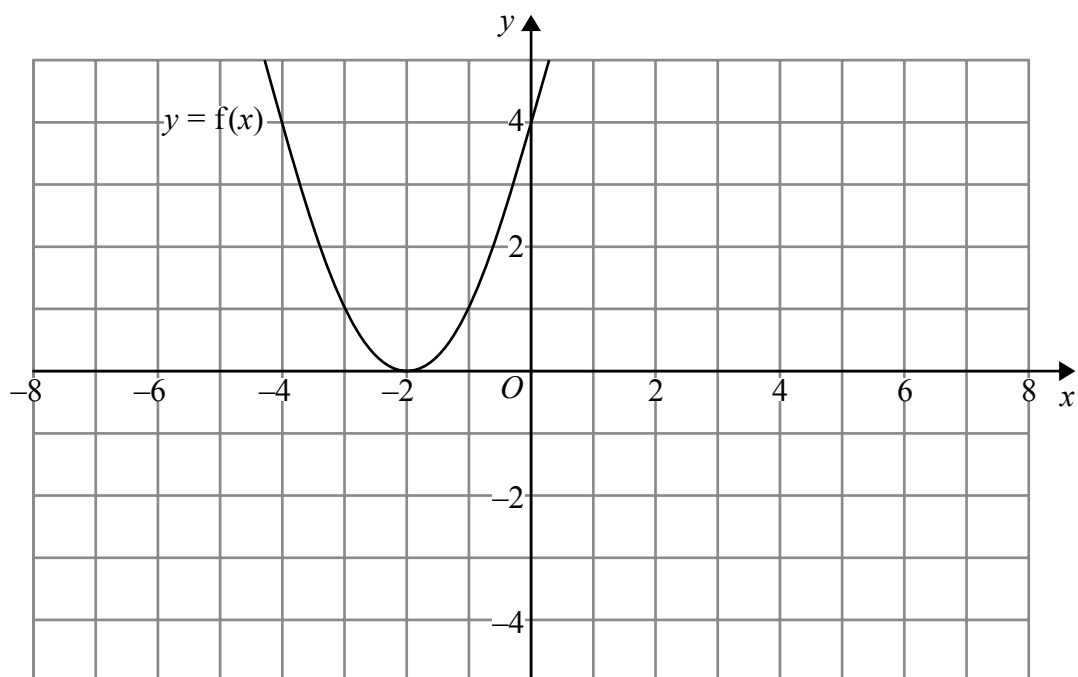
(2)

10 The graph of  $y = f(x)$  is shown on both grids below.



(a) On the grid above, sketch the graph of  $y = f(-x)$

(1)



(b) On this grid, sketch the graph of  $y = -f(x) + 3$

(1)

**(Total 2 marks)**

- 11 The graph of  $y = f(x)$  is transformed to give the graph of  $y = -f(x + 3)$   
The point  $A$  on the graph of  $y = f(x)$  is mapped to the point  $P$  on the  
graph of  $y = -f(x + 3)$

The coordinates of point  $A$  are  $(9, 1)$

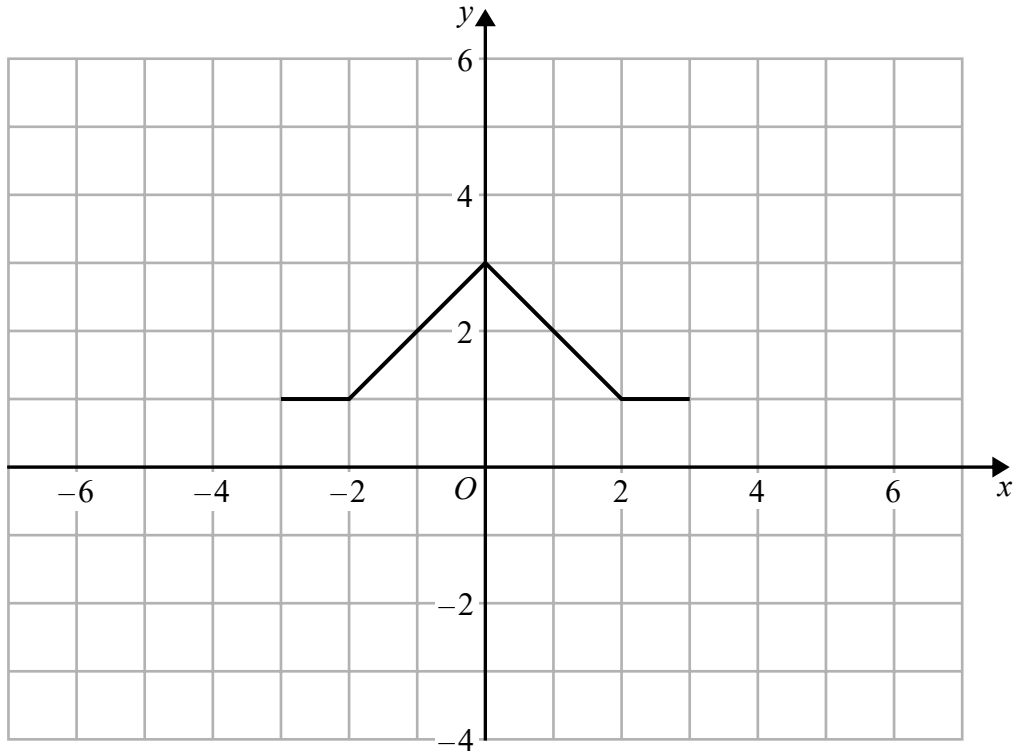
Find the coordinates of point  $P$ .

(....., .....) )

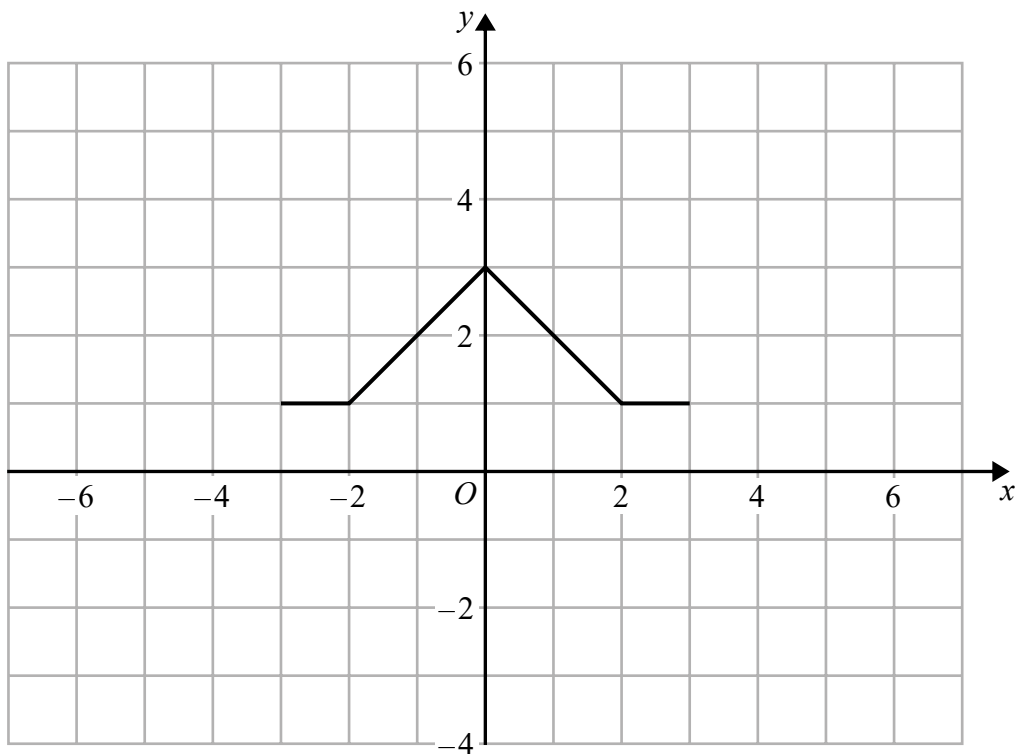
**(Total 2 marks)**

12 (b) The graph of  $y = f(x)$  is shown on both grids below.

(i) On this grid, draw the graph of  $y = -f(x)$



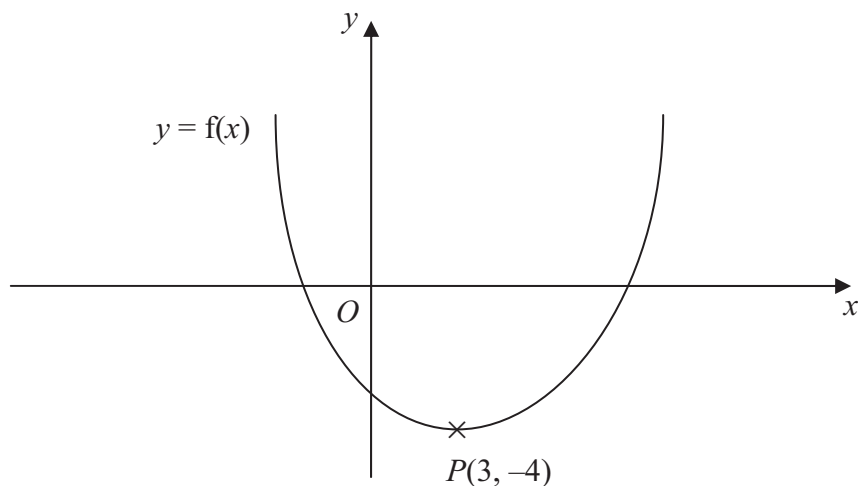
(ii) On the grid below, draw the graph of  $y = f(x - 3)$



(2)

**(Total 2 marks)**

- 13 This is a sketch of the curve with the equation  $y = f(x)$ .  
The only minimum point of the curve is at  $P(3, -4)$ .



- (a) Write down the coordinates of the minimum point of the curve with the equation  $y = f(x - 2)$

(..... , .....)  
(2)

- (b) Write down the coordinates of the minimum point of the curve with the equation  $y = f(x + 5) + 6$

(..... , .....)  
(2)

**(Total 4 marks)**