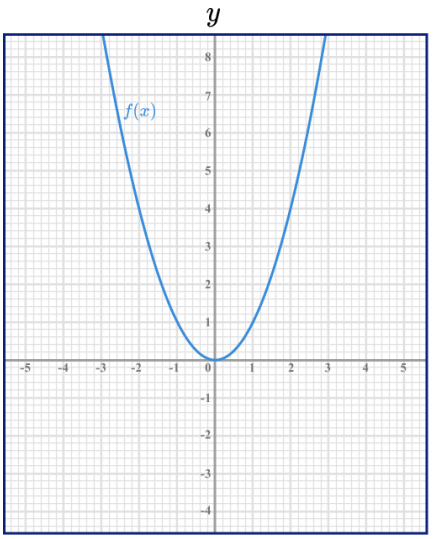
Transformations of Graphs - Worksheet

Skill

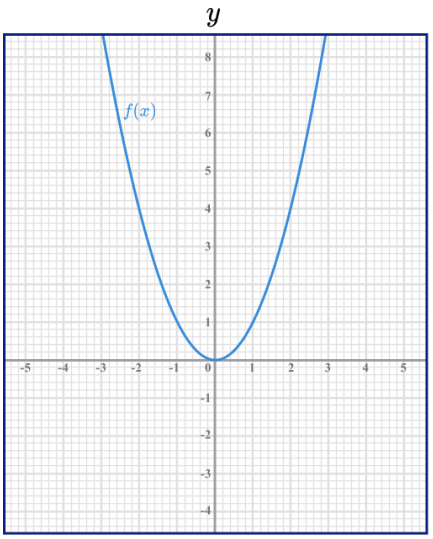
Group A - Transforming functions vertically (y direction)

On the grids below sketch the following functions:

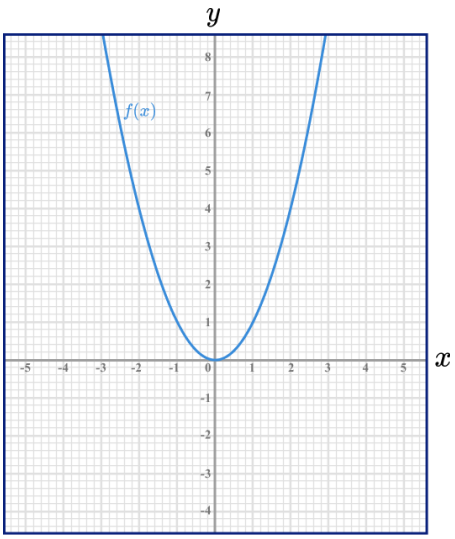
1) $y = f(x) + 1$



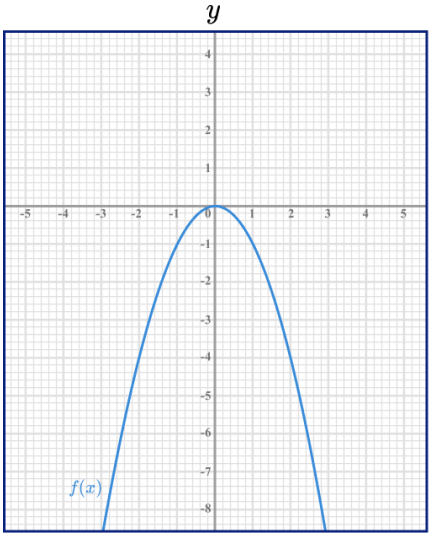
2) $y = f(x) - 1$



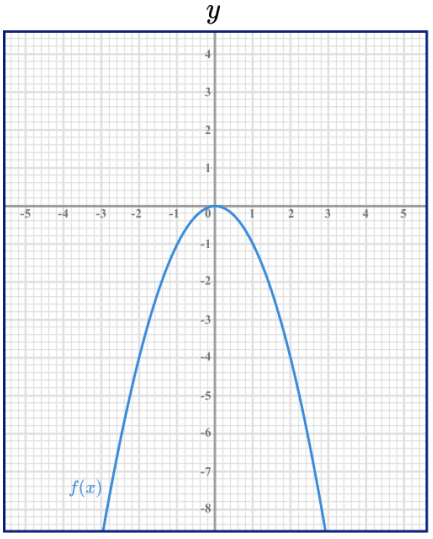
3) $y = f(x) - 2$



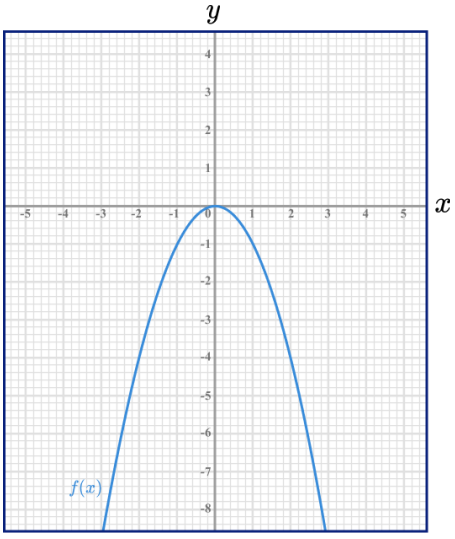
4) $y = f(x) + 1$



5) $y = f(x) - 1$

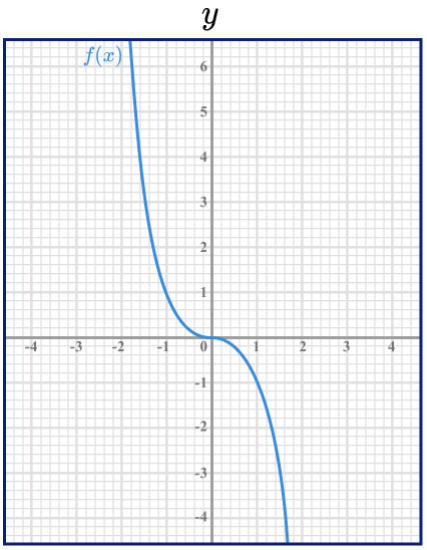


6) $y = f(x) - 2$

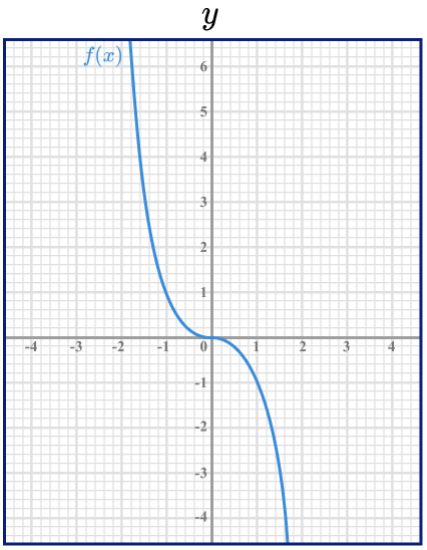


Transformations of Graphs - Worksheet

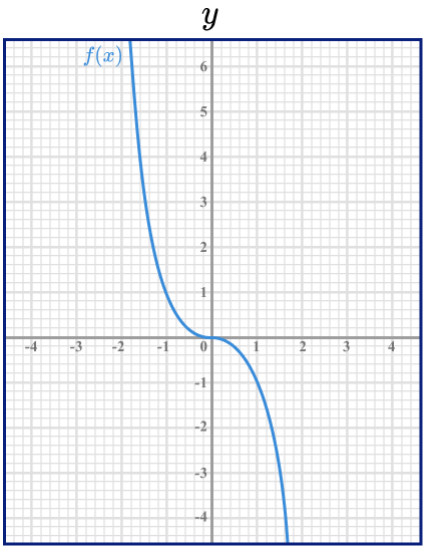
7) $y = f(x) + 1$



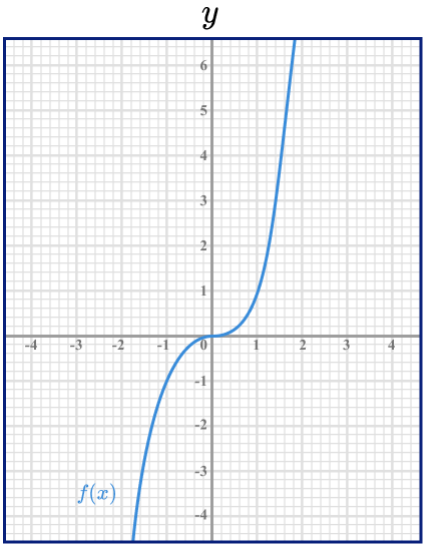
8) $y = f(x) - 1$



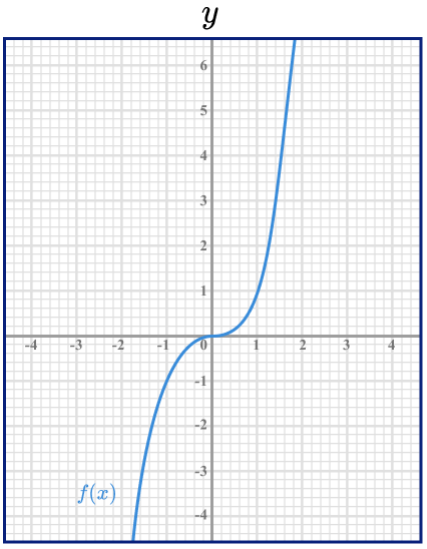
9) $y = f(x) - 2$



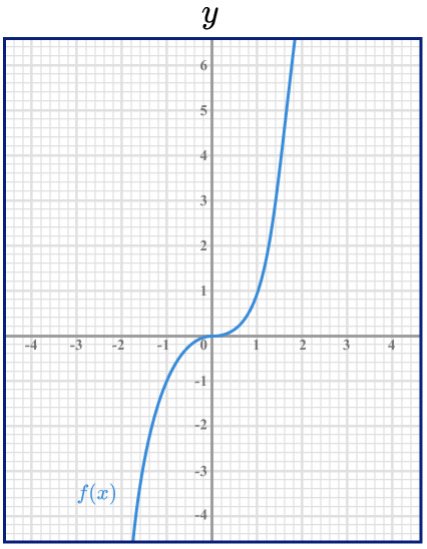
10) $y = f(x) + 1$



11) $y = f(x) - 1$



12) $y = f(x) - 2$

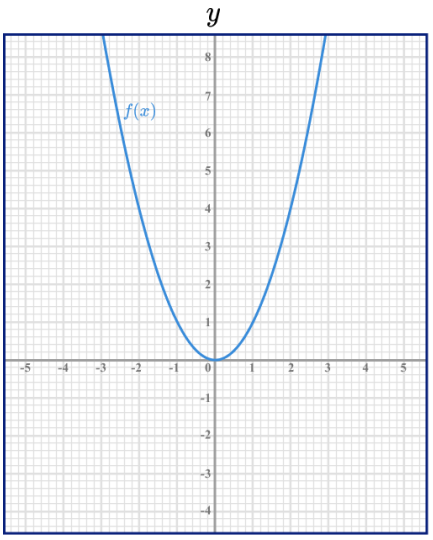


Transformations of Graphs - Worksheet

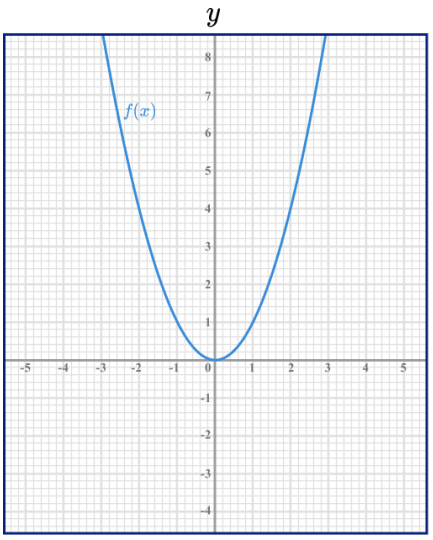
Group B - Transforming functions horizontally (x direction)

On the grids below sketch the following functions:

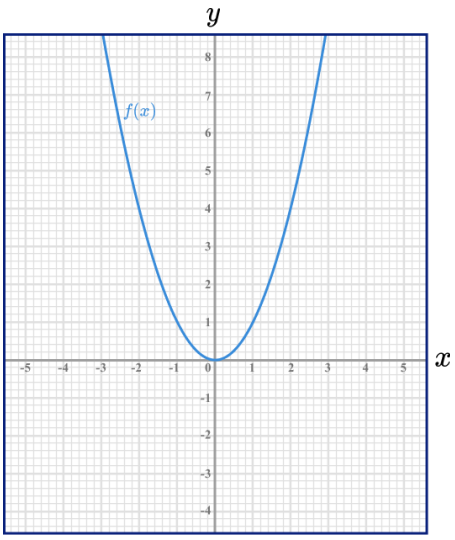
1) $y = f(x + 1)$



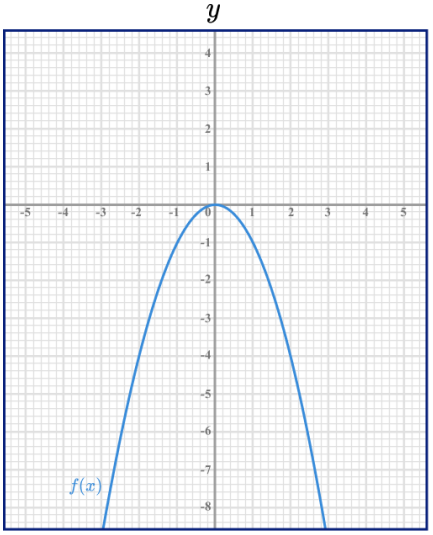
2) $y = f(x - 1)$



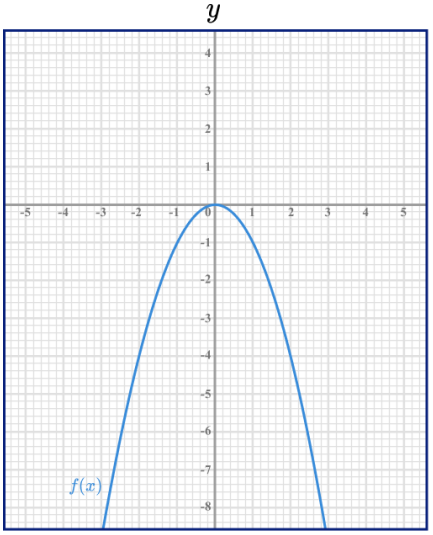
3) $y = f(x + 1) + 1$



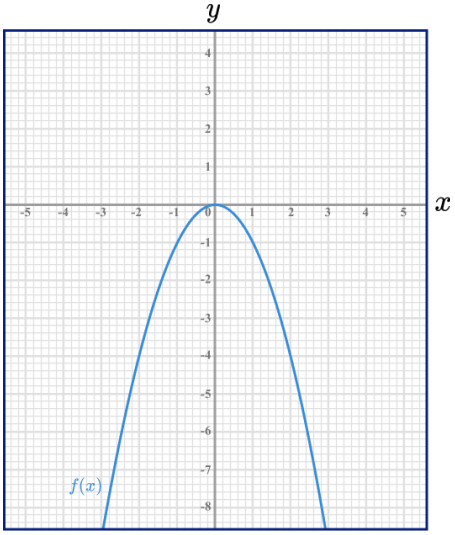
4) $y = f(x + 1)$



5) $y = f(x - 1)$

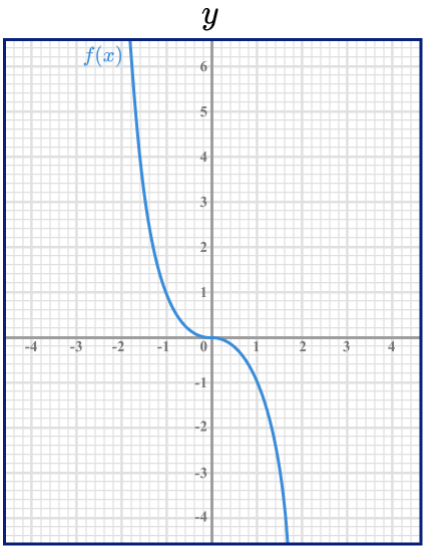


6) $y = f(x + 1) + 1$

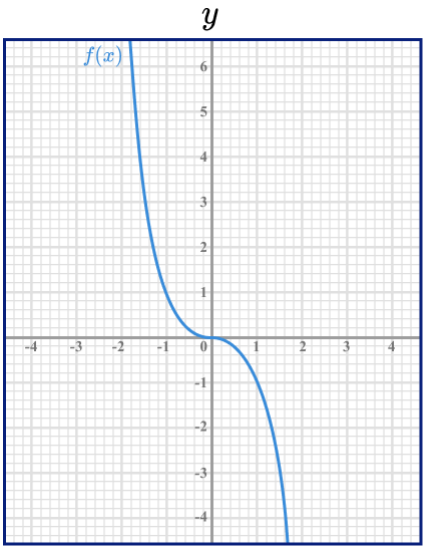


Transformations of Graphs - Worksheet

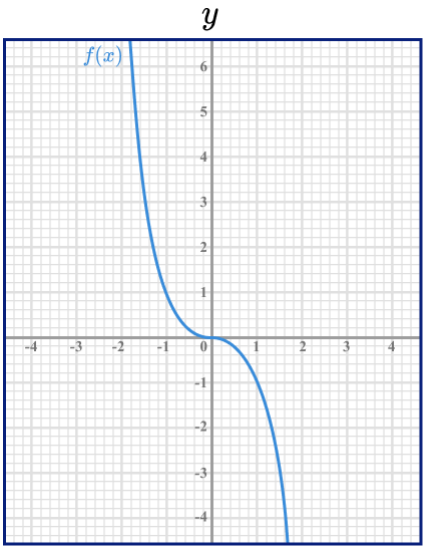
7) $y = f(x + 1)$



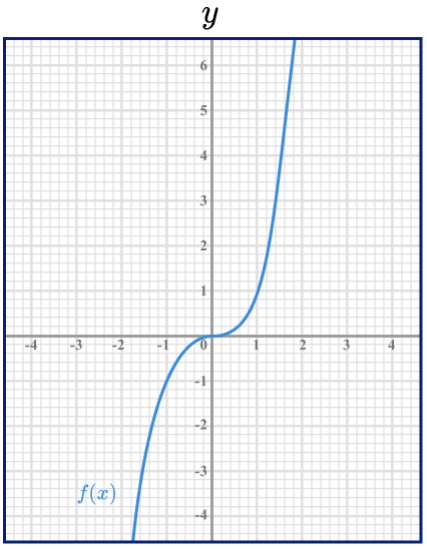
8) $y = f(x - 1)$



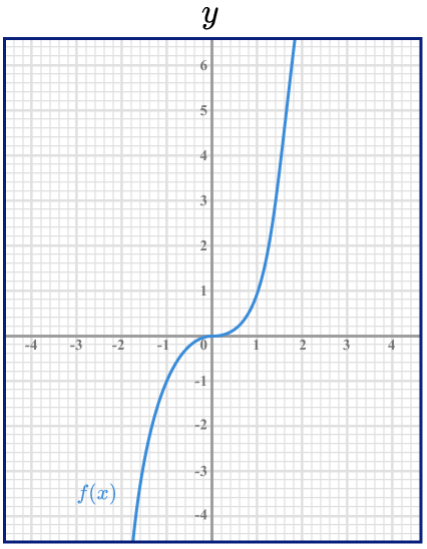
9) $y = f(x + 1) + 1$



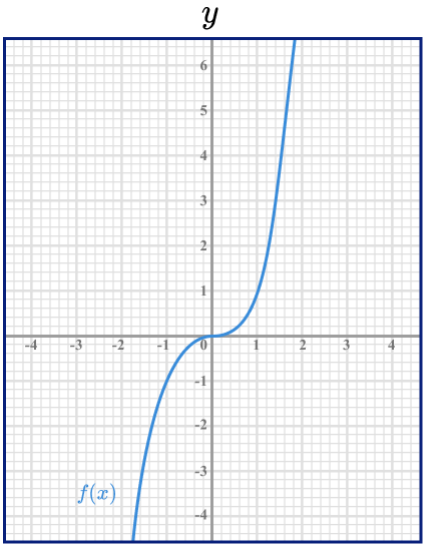
10) $y = f(x + 1)$



11) $y = f(x - 1)$



12) $y = f(x + 1) + 1$

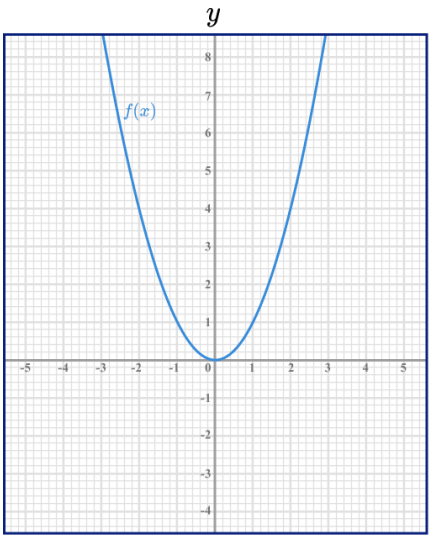


Transformations of Graphs - Worksheet

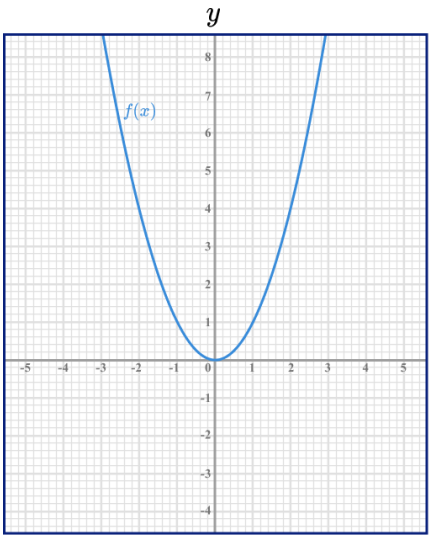
Group C - Reflecting functions ($-f(x)$ or $f(-x)$)

On the grids below sketch the following functions:

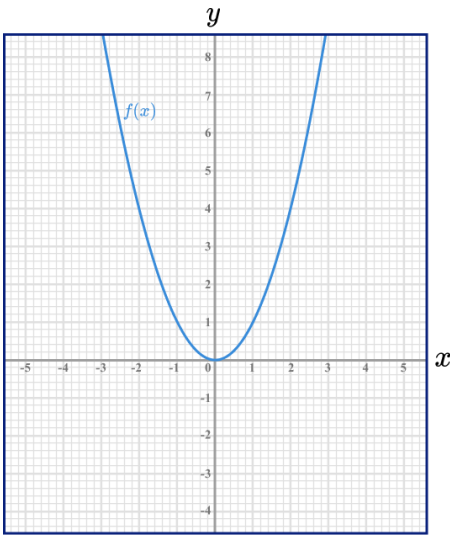
1) $-f(x)$



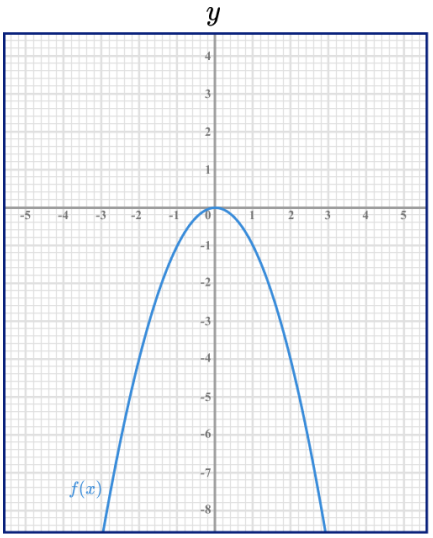
2) $f(-x)$



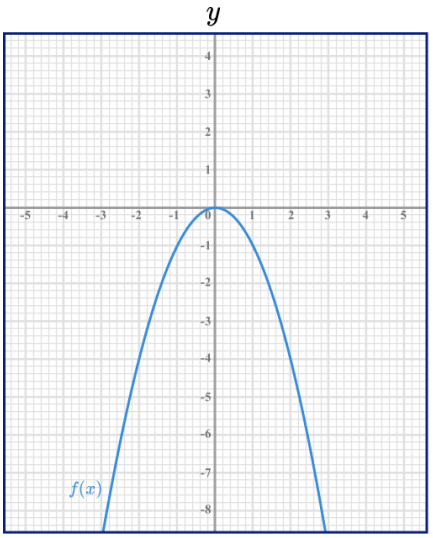
3) $f(-x)+1$



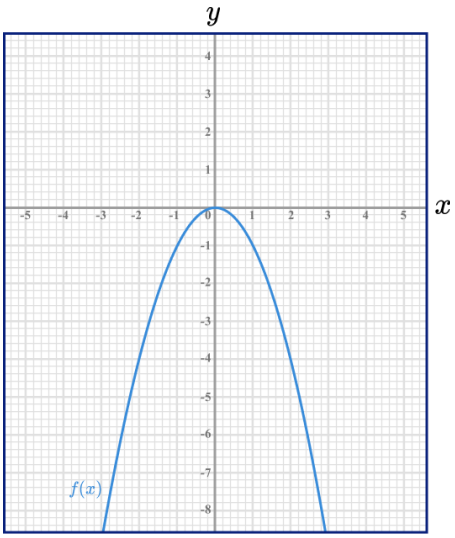
4) $-f(x)$



5) $f(-x)$

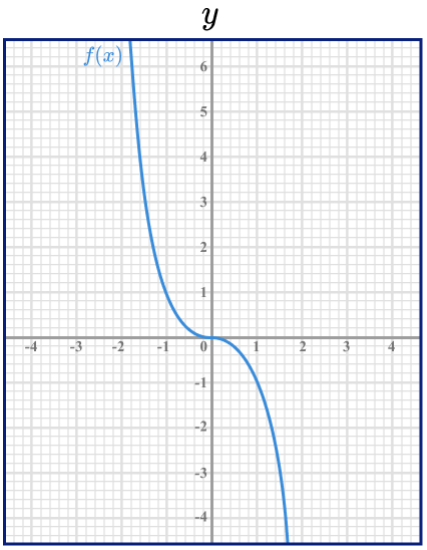


6) $f(-x)+1$

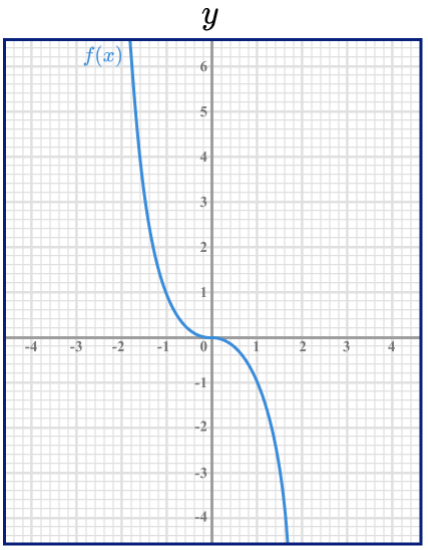


Transformations of Graphs - Worksheet

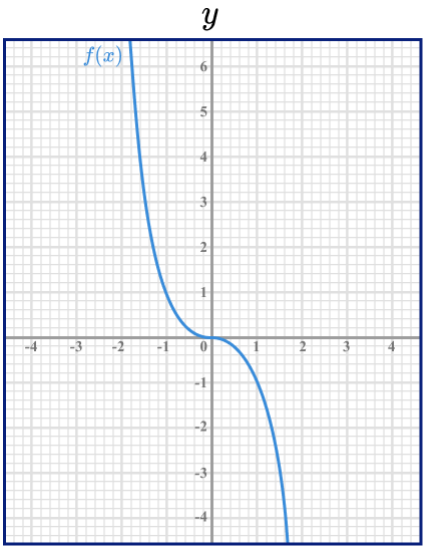
7) $-f(x)$



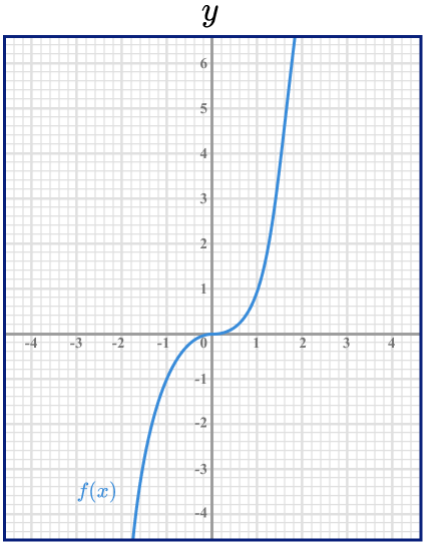
8) $f(-x)$



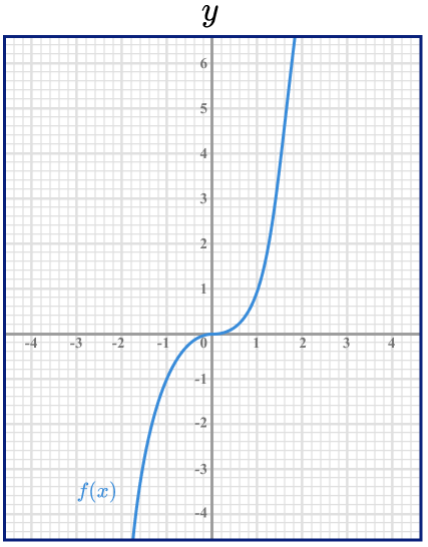
9) $f(-x)+1$



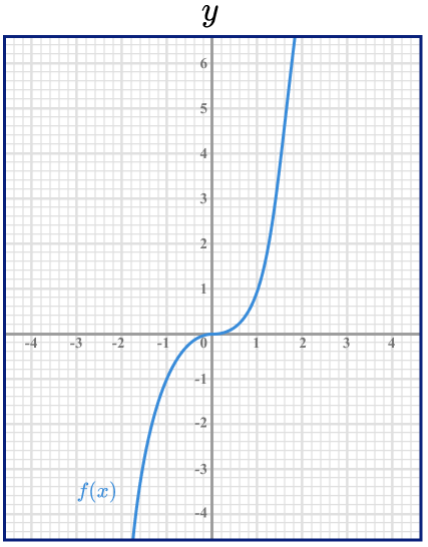
10) $-f(x)$



11) $f(-x)$



12) $f(-x)+1$



Transformations of Graphs - Worksheet

Applied

1) A curve is drawn with the equation $y = f(x)$
The coordinates of the minimum point of the curve are $(4,\ 3)$

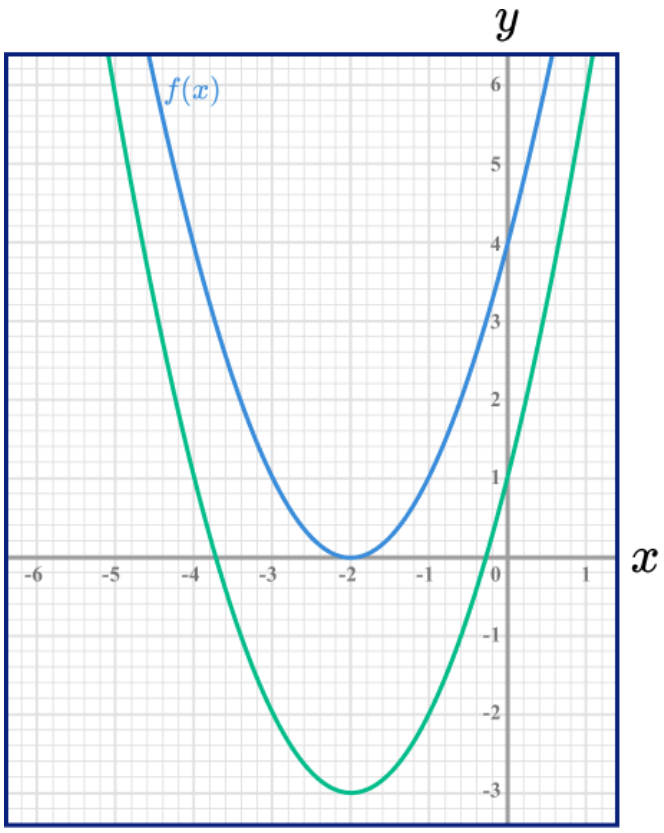
Write down the coordinates of the minimum point of the curve with the equation:

(a) $y = f(x) - 4$

(b) $y = f(x - 4)$

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

2)

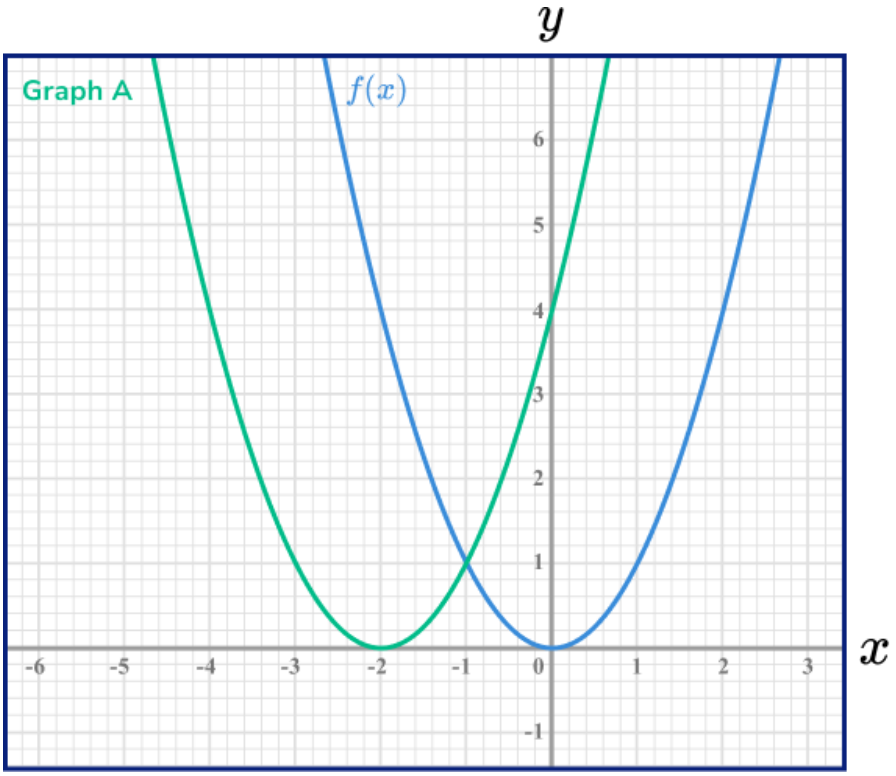


The curve with equation $y = f(x)$ is translated so that the point at $(-2,\ 0)$ is mapped onto the point $(-2, -3)$.

Find an equation of the translated curve.

Transformations of Graphs - Worksheet

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

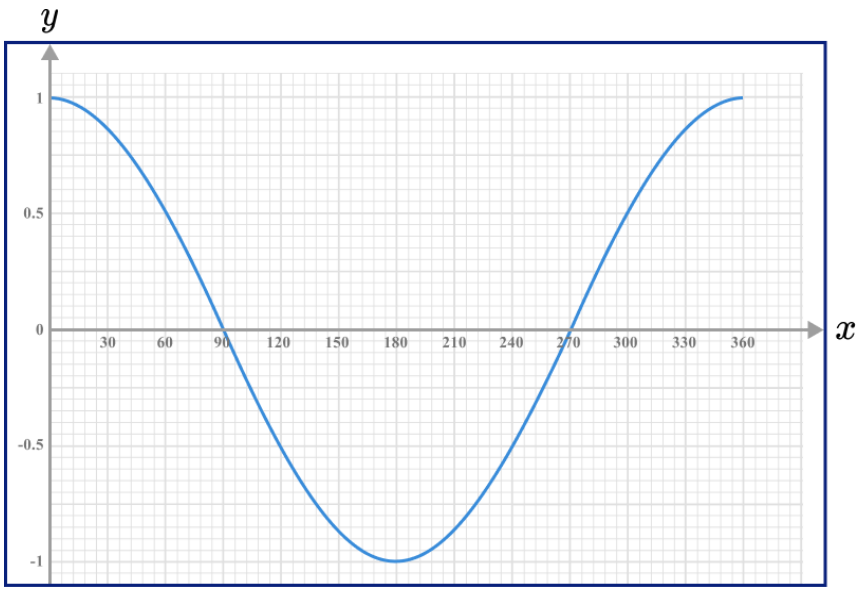


Graph A is a translation of the graph $y = f(x)$.

Write down the equation of graph A.

Transformations of Graphs - Exam Questions

1) Shown below is the graph of $y = \cos(x)$

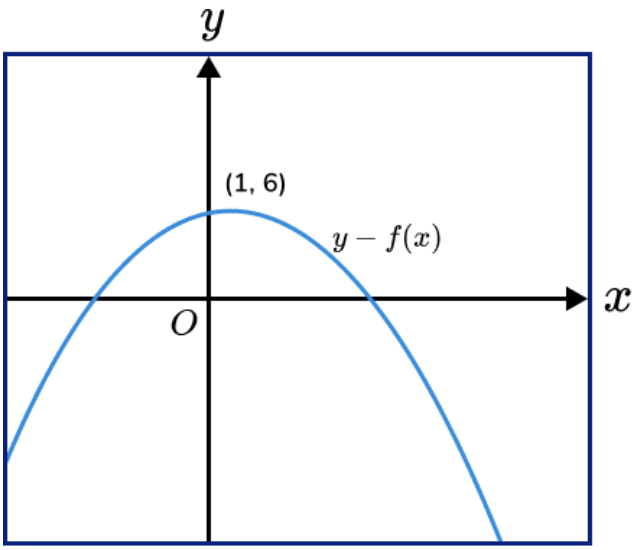


On the grid, sketch the graph of $y = \cos(x - 90)$ for all values of x from 0° to 360°.

(2 marks)

Transformations of Graphs - Exam Questions

2) The graph of $y = f(x)$ is shown below.



The coordinates of the turning point of this curve are $(1\ ,\ 6)$.

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

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

.....

(1)

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

.....

(1)

(c) $y = f(x) - 3$

.....

(1)

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

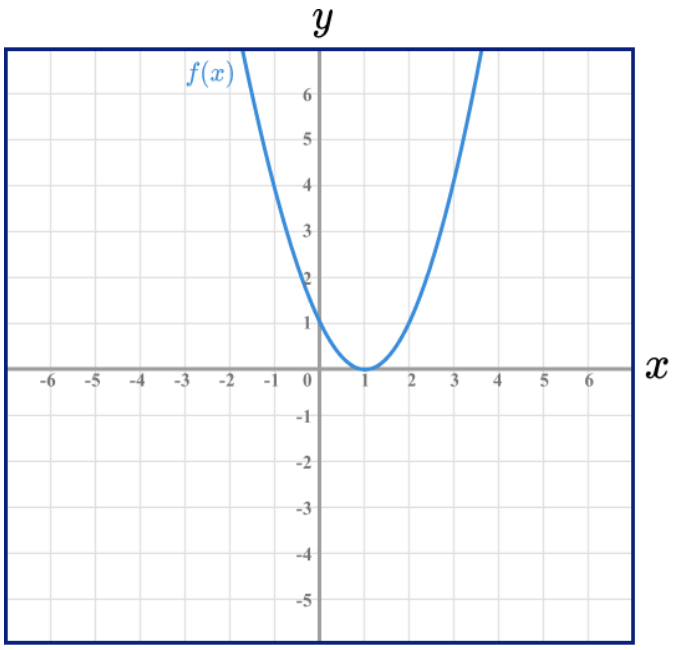
.....

(1)

(4 marks)

Transformations of Graphs - Exam Questions

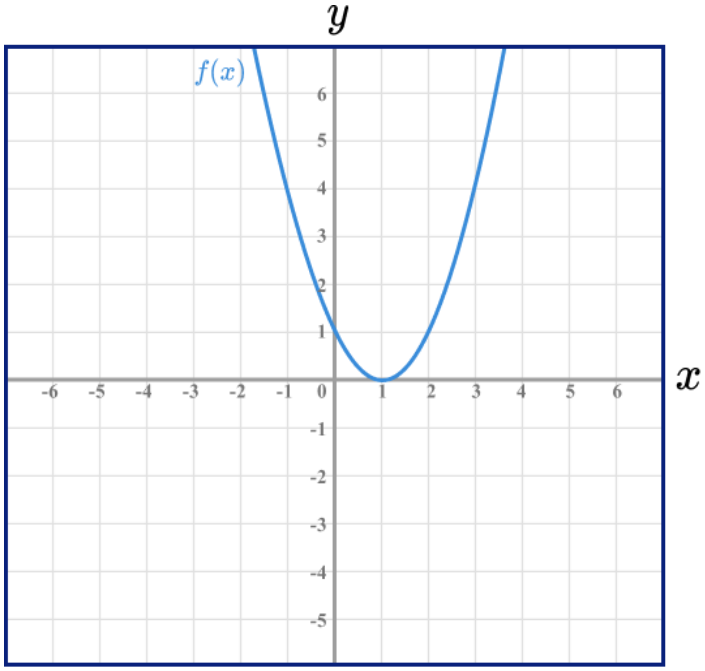
3) The graph of $y = f(x)$ is shown on both grids below.



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

(2)

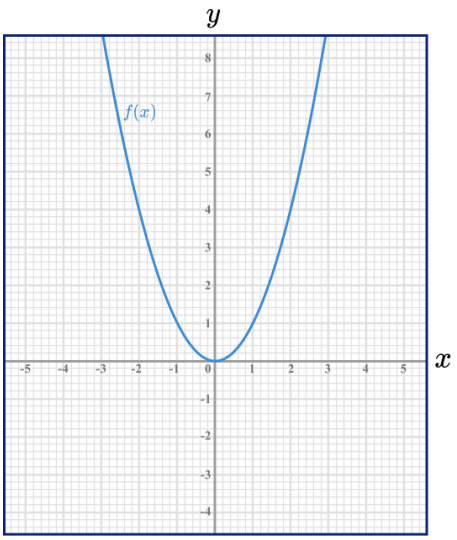
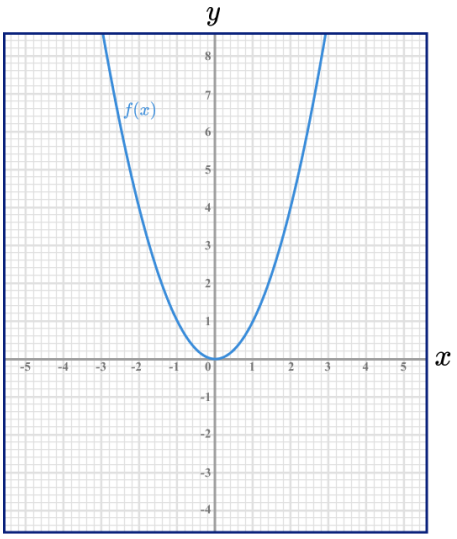
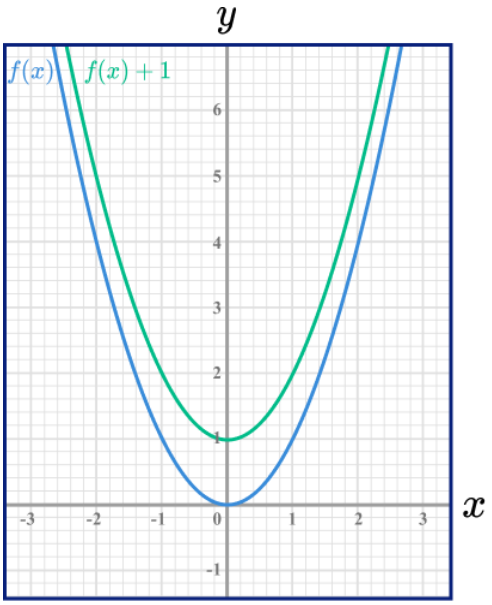
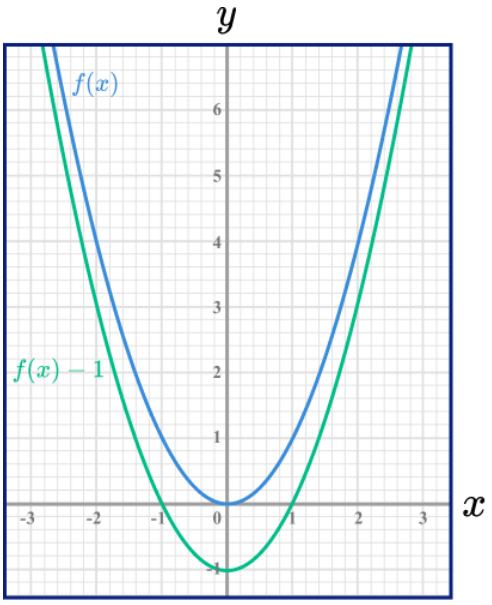
(b) On the grid below, sketch the graph of $y = f(x + 2)$



(2)

(4 marks)

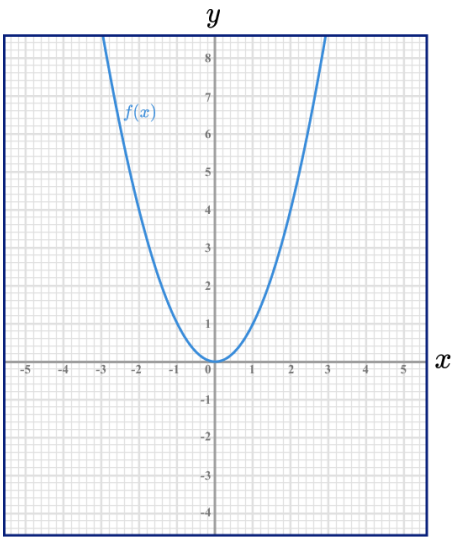
Transformations of Graphs - Answers

	Question	Answer
	Skill Questions	
Group A	On the grids below sketch the following functions: **1)** $y = f(x) + 1$  **2)** $y = f(x) - 1$  	**1)**  **2)** 

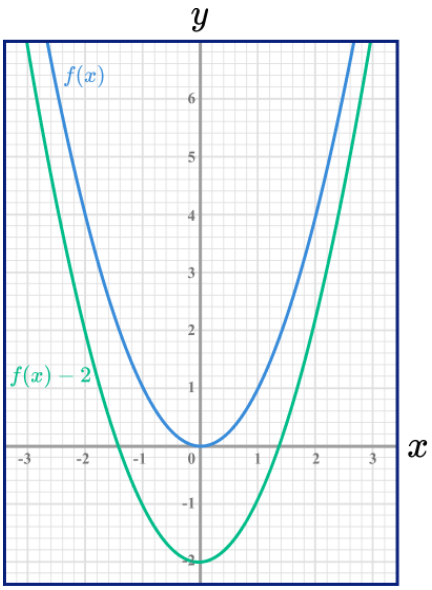
Transformations of Graphs - Answers

Group A contd

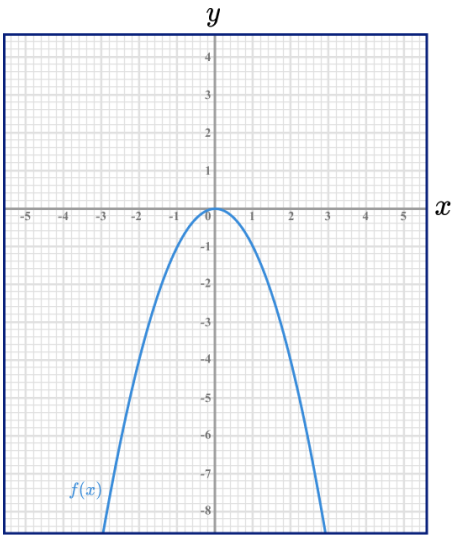
3) $y = f(x) - 2$



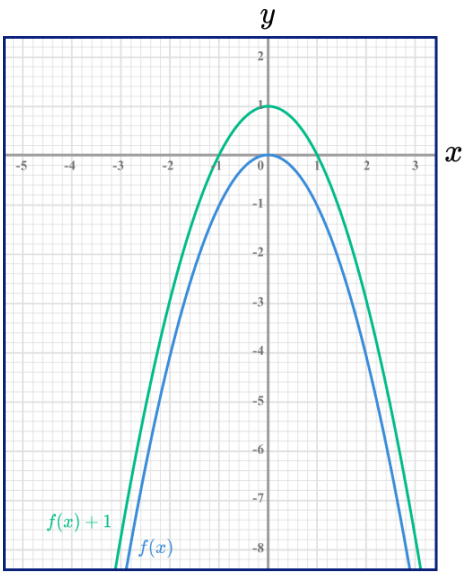
3)



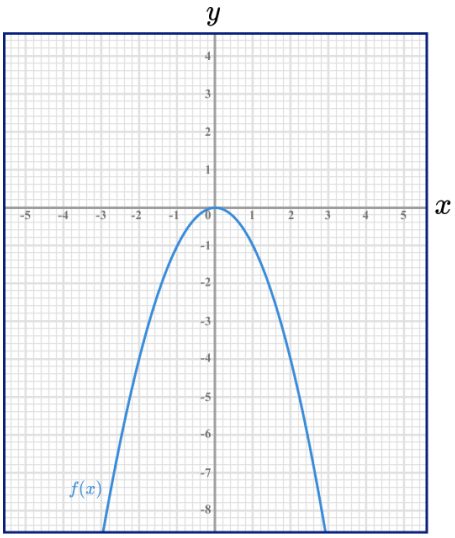
4) $y = f(x) + 1$



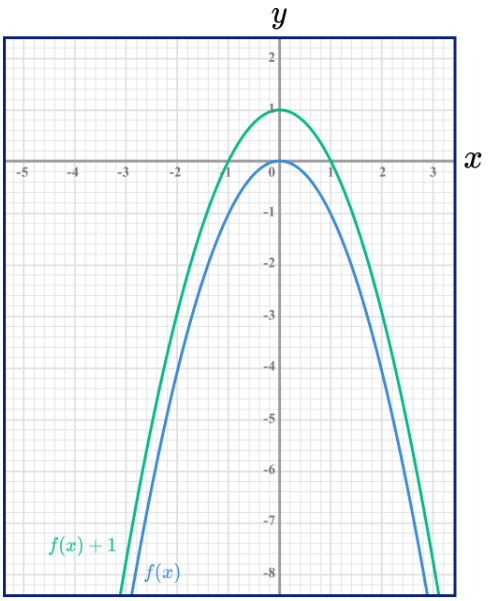
4)



5) $y = f(x) - 1$



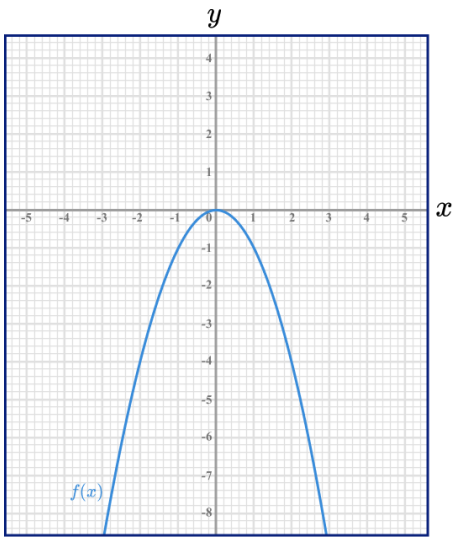
5)



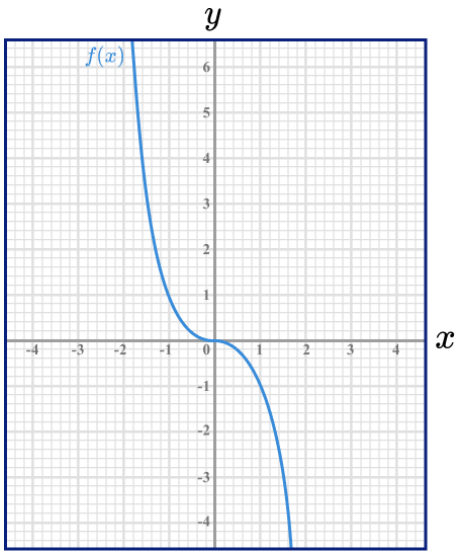
Transformations of Graphs - Answers

Group A contd

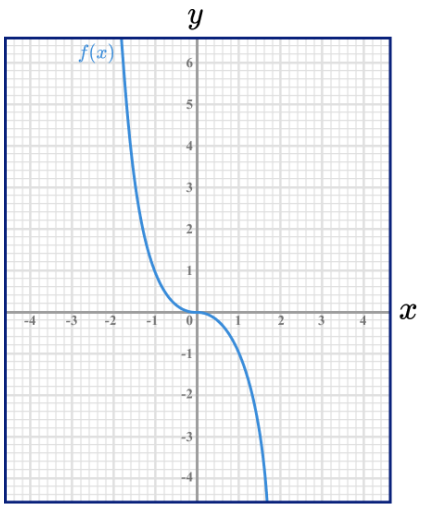
6) $y = f(x) - 2$



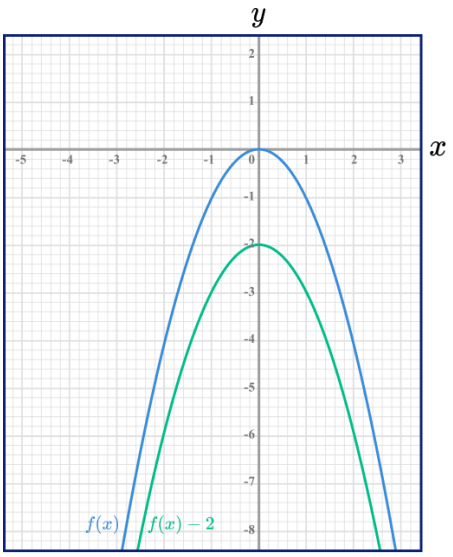
7) $y = f(x) + 1$



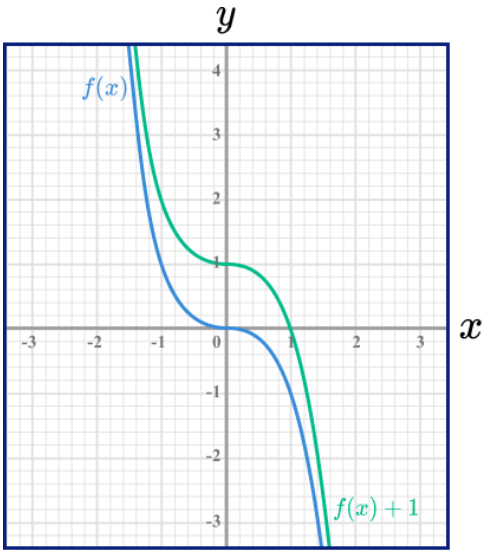
8) $y = f(x) - 1$



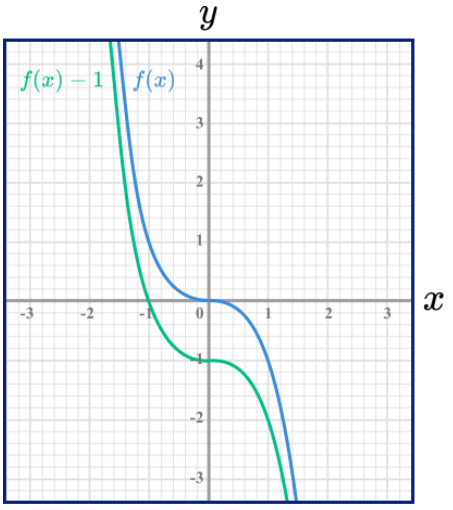
6)



7)



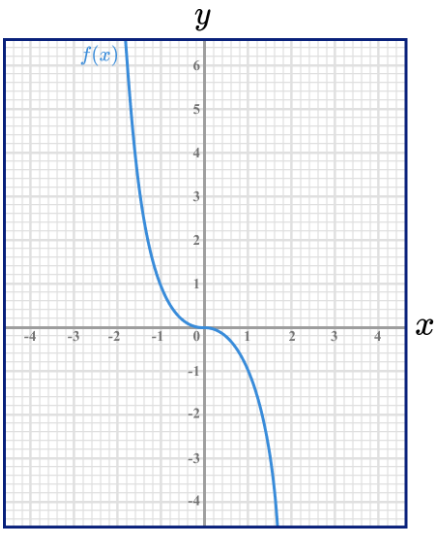
8)



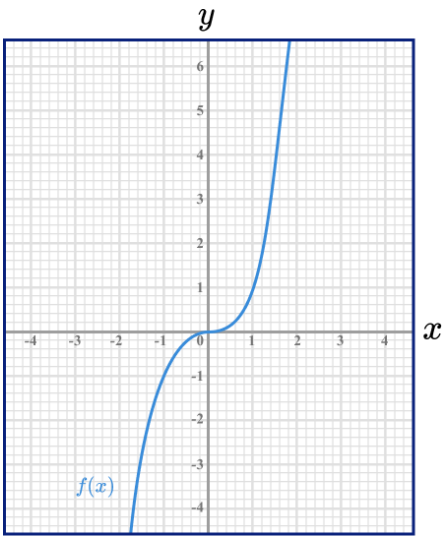
Transformations of Graphs - Answers

Group A contd

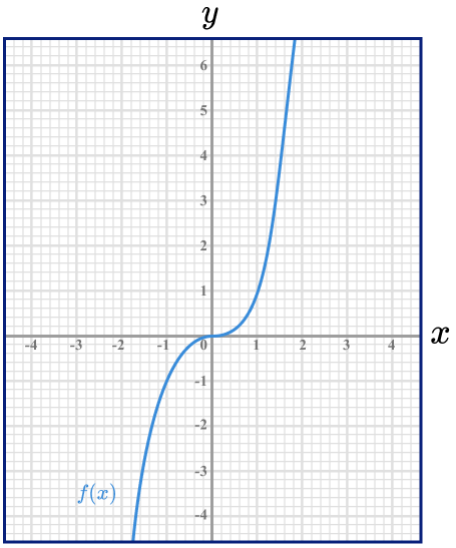
9) $y = f(x) - 2$



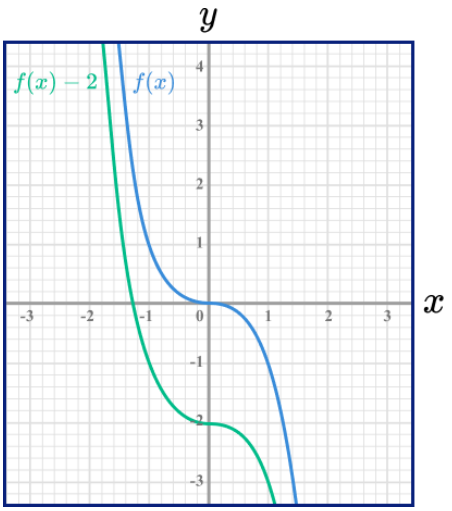
10) $y = f(x) + 1$



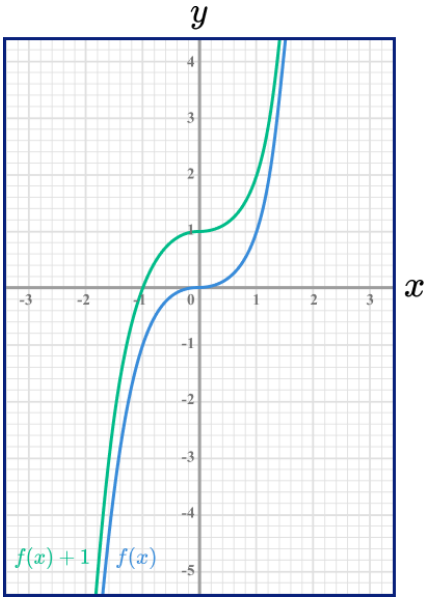
11) $y = f(x) - 1$



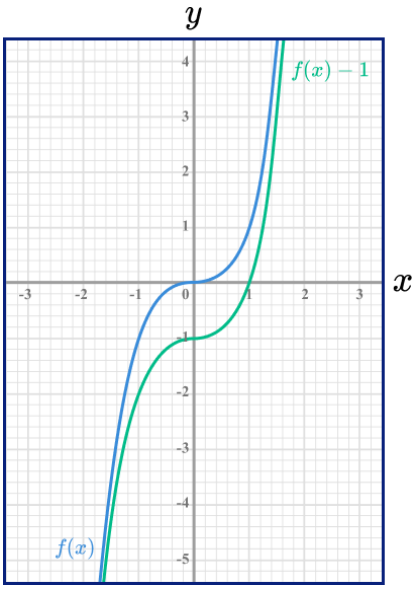
9)



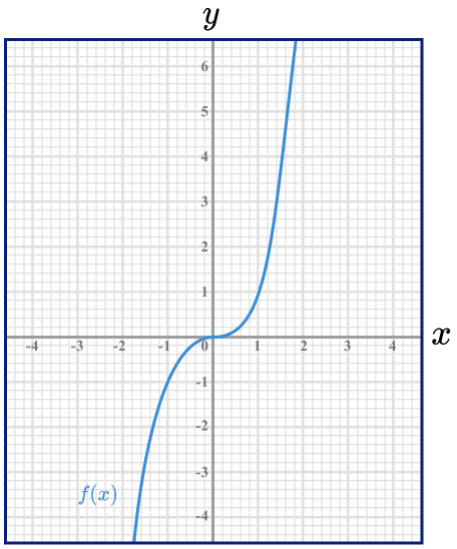
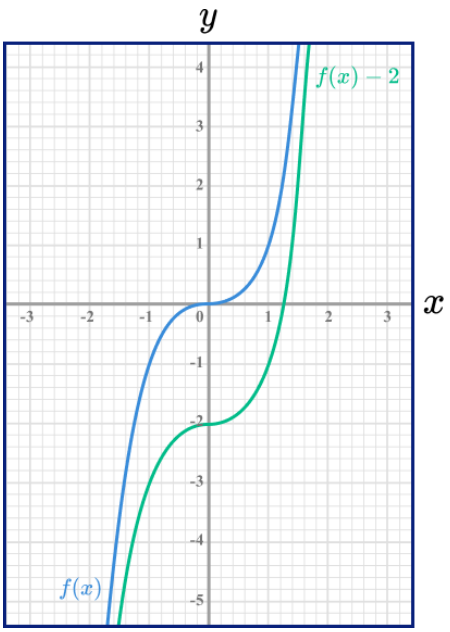
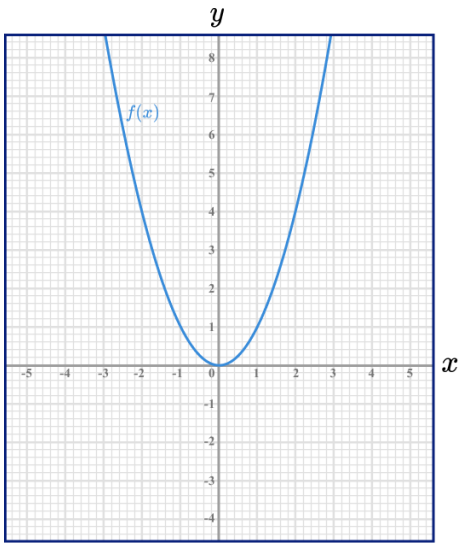
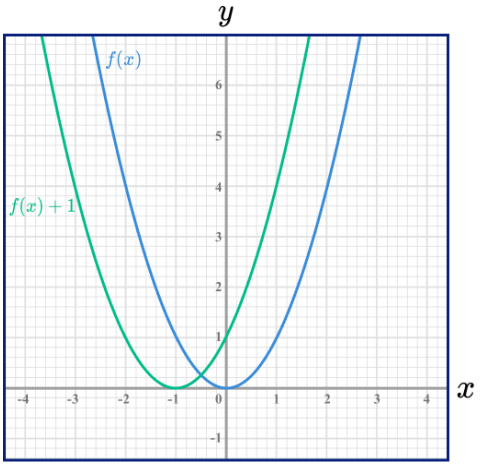
10)



11)



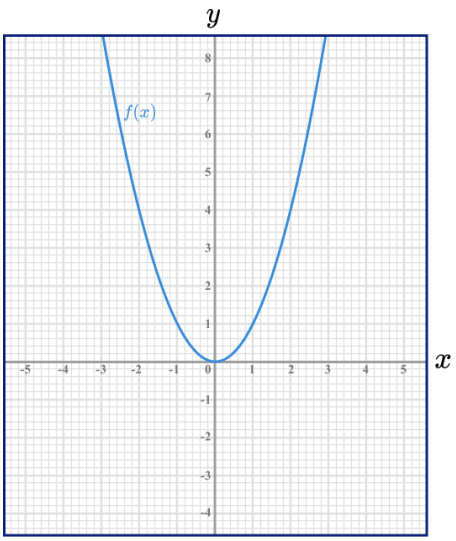
Transformations of Graphs - Answers

Group A contd	**12)** $y = f(x) - 2$ 	**12)** 
Group B	On the grids below sketch the following functions: **1)** $y = f(x + 1)$ 	**1)** 

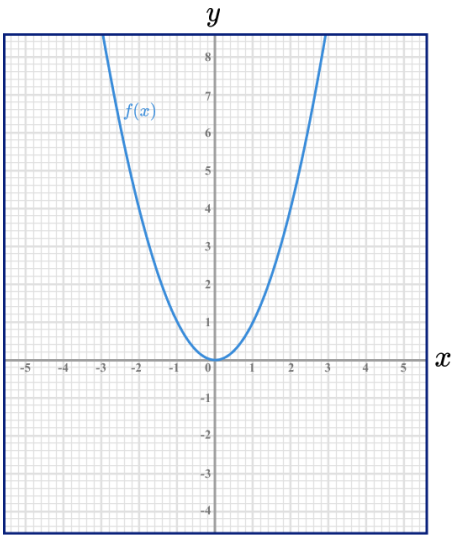
Transformations of Graphs - Answers

Group B contd

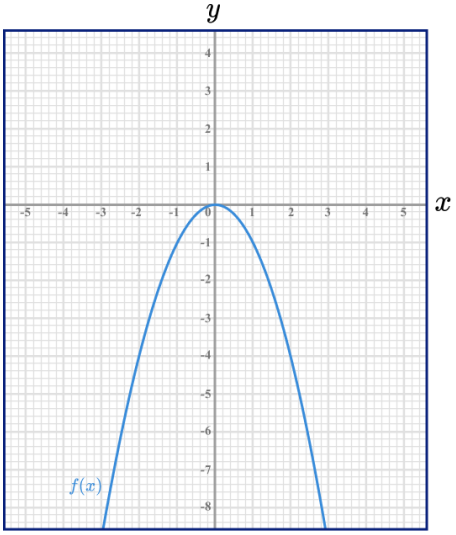
2) $y = f(x - 1)$



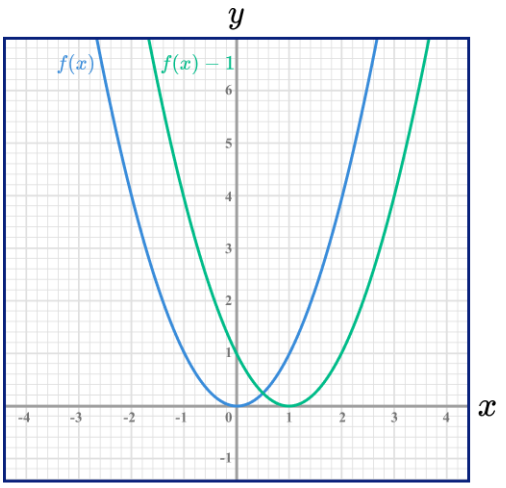
3) $y = f(x + 1) + 1$



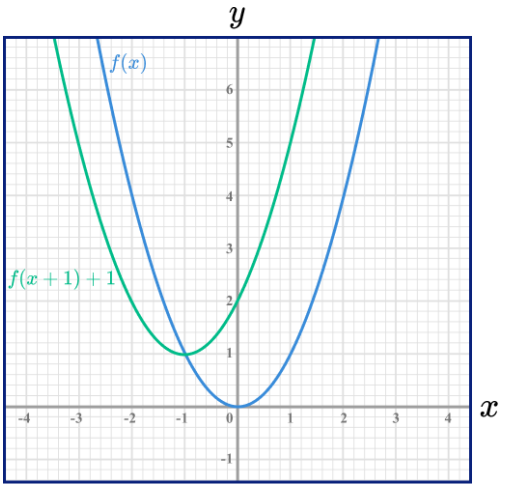
4) $y = f(x + 1)$



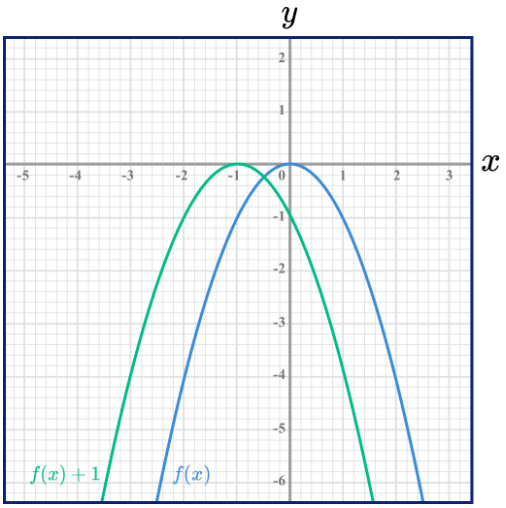
2)



3)



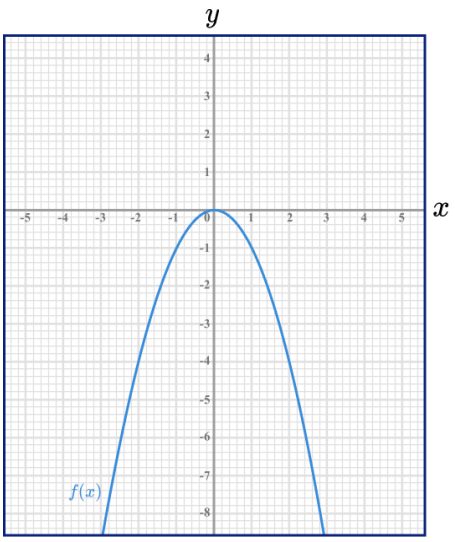
4)



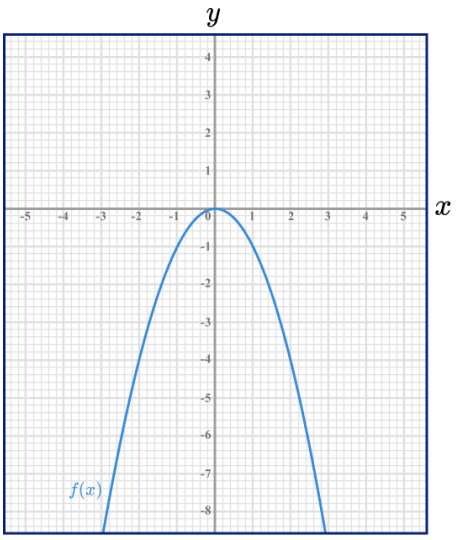
Transformations of Graphs - Answers

Group B contd

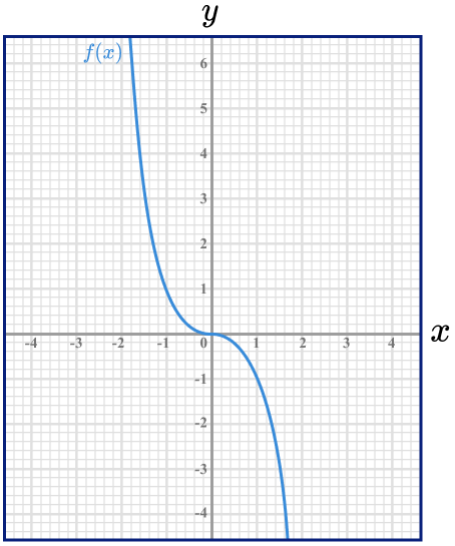
5) $y = f(x - 1)$



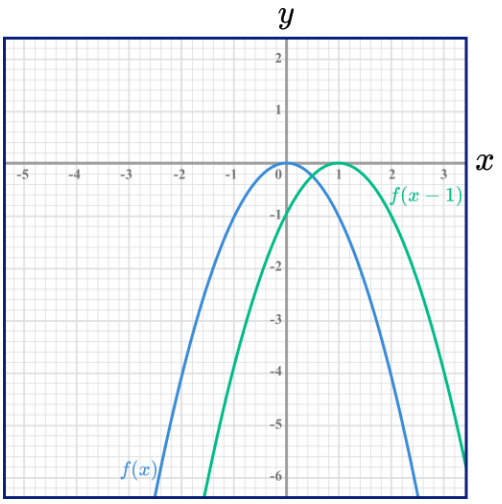
6) $y = f(x + 1) + 1$



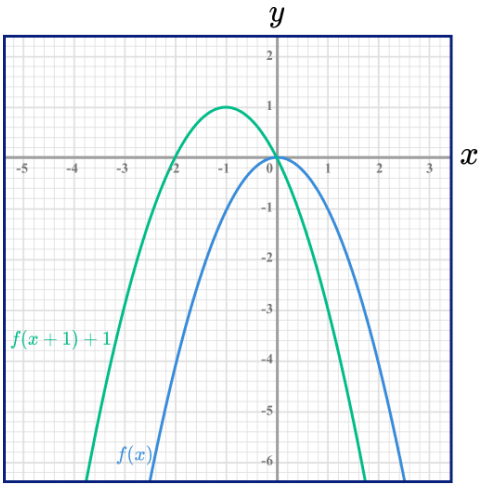
7) $y = f(x + 1)$



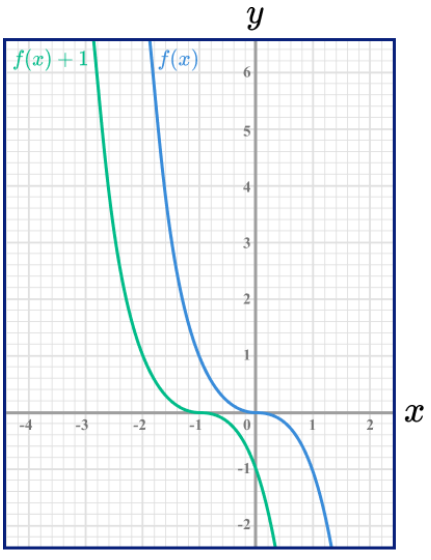
5)



6)



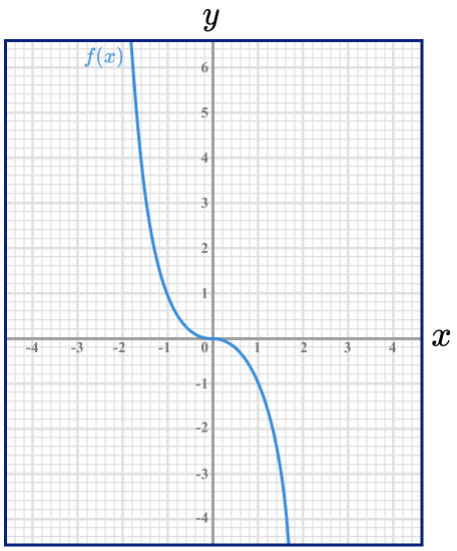
7)



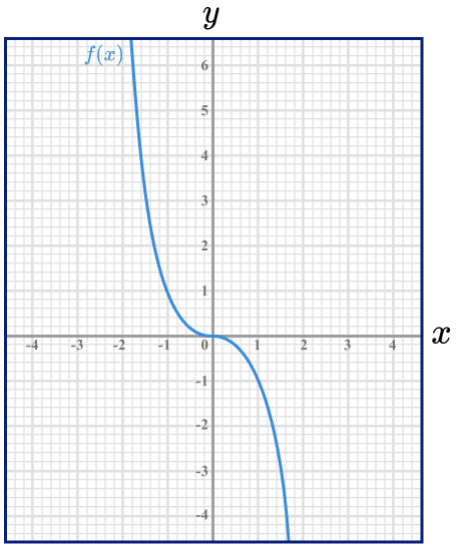
Transformations of Graphs - Answers

Group B contd

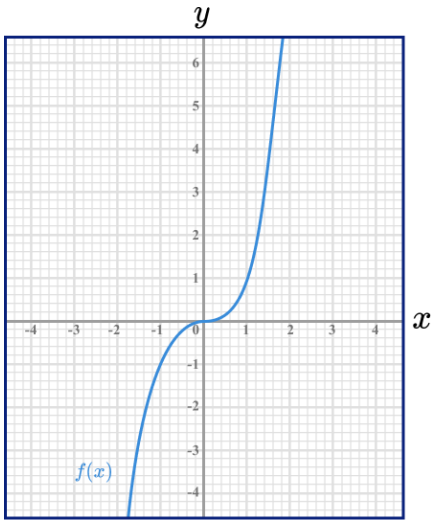
8) $y = f(x - 1)$



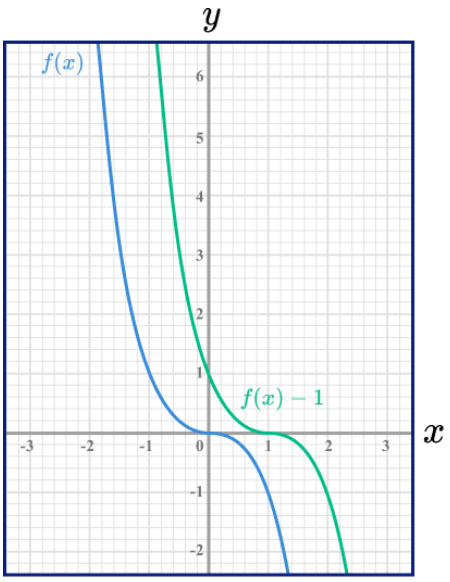
9) $y = f(x + 1) + 1$



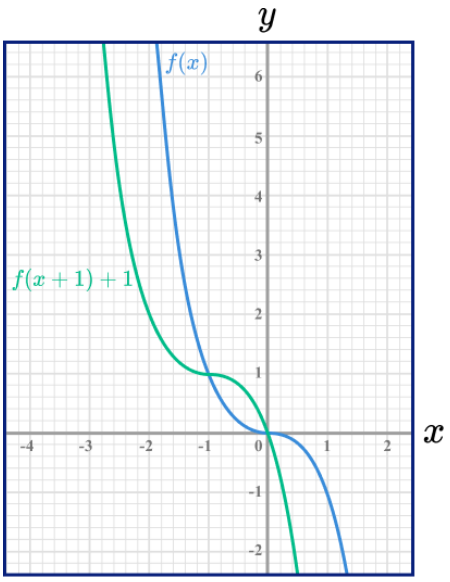
10) $y = f(x + 1)$



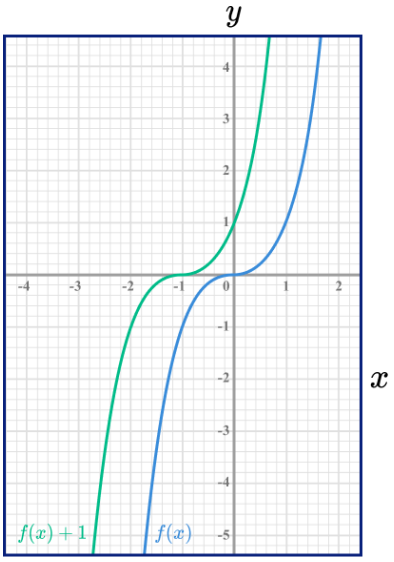
8)



9)



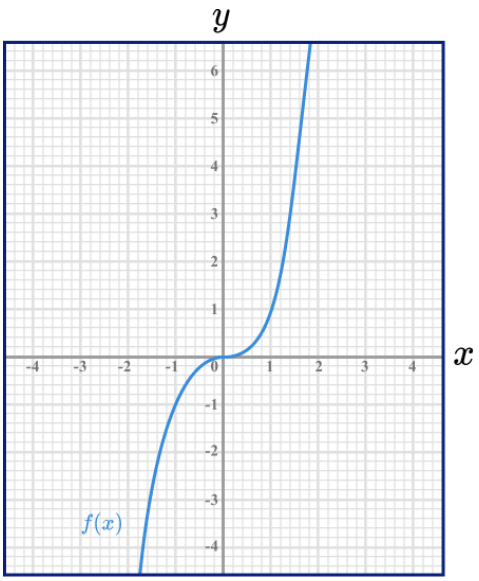
10)



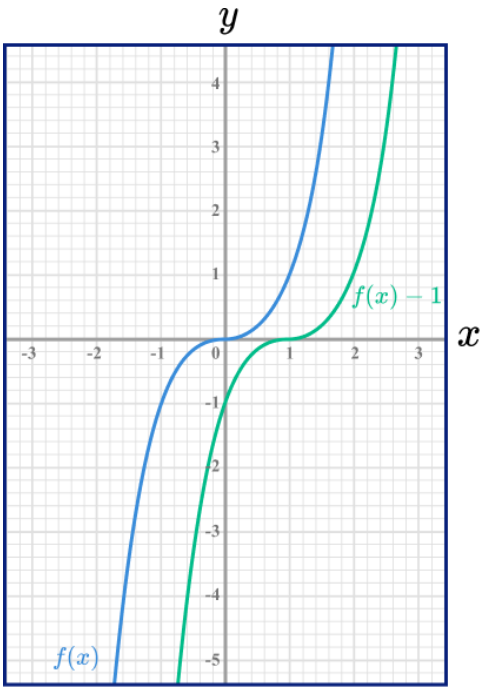
Transformations of Graphs - Answers

Group B contd

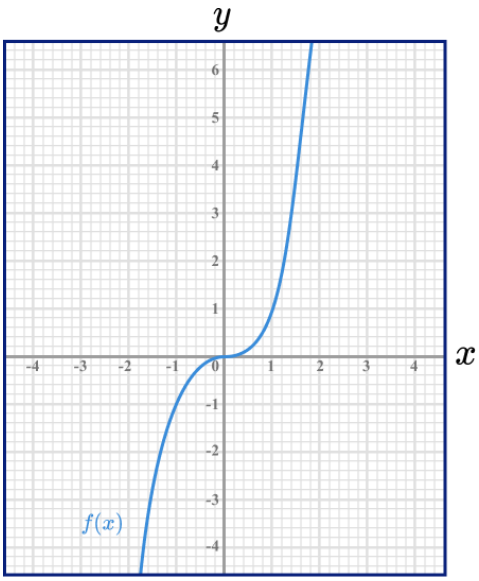
11) $y = f(x - 1)$



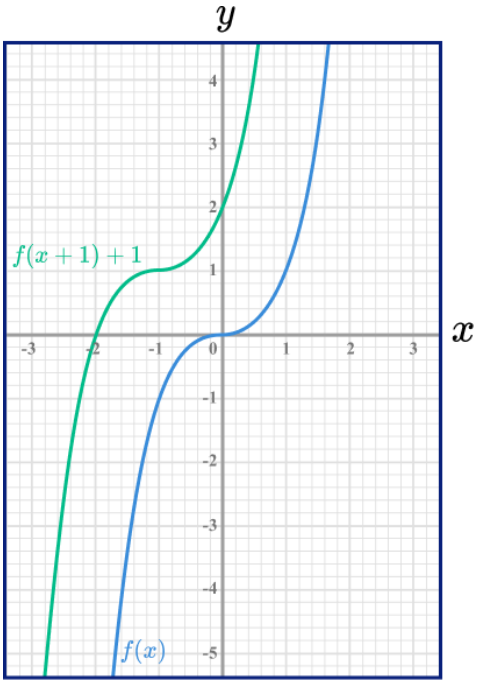
11)



12) $y = f(x + 1) + 1$



12)

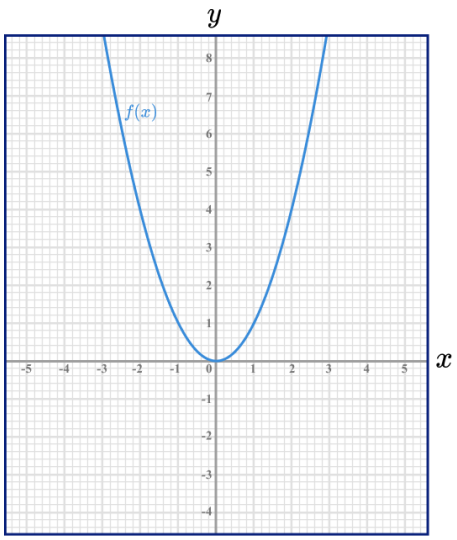


Transformations of Graphs - Answers

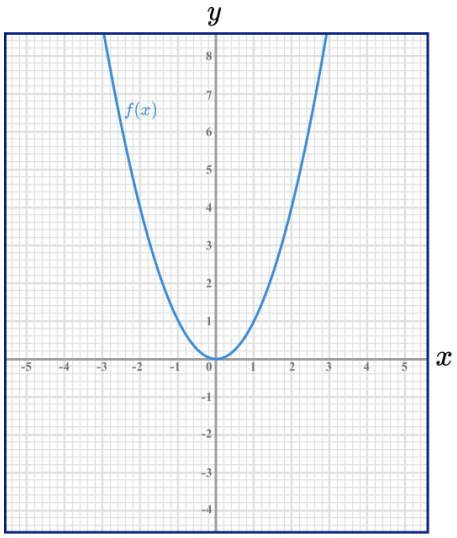
Group C

On the grids below sketch the following functions:

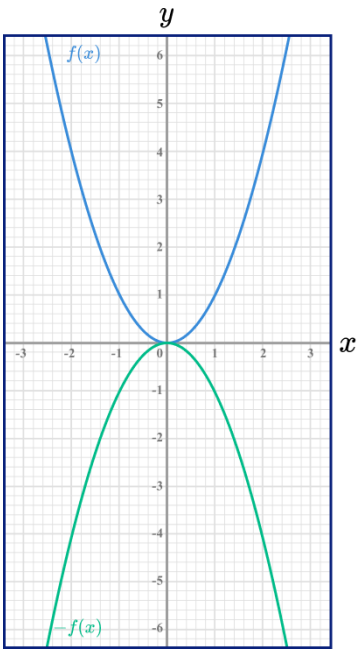
1) $-f(x)$



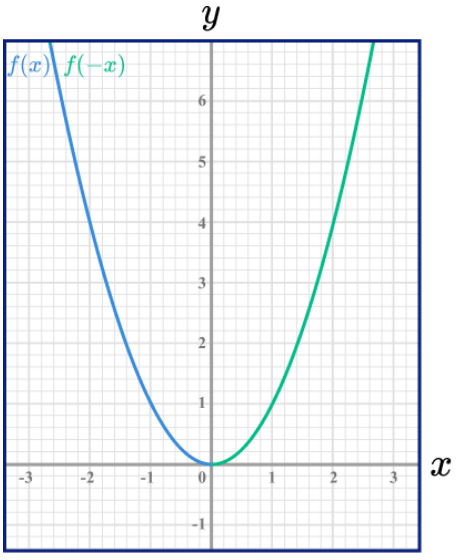
2) $f(-x)$



1)



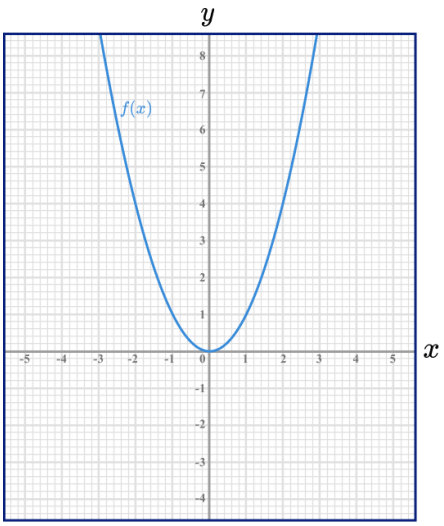
2)



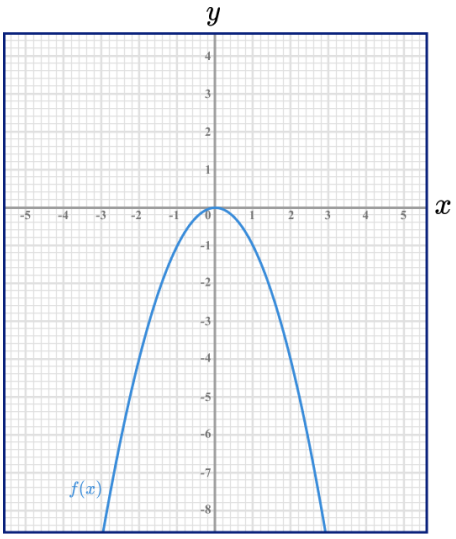
Transformations of Graphs - Answers

Group C contd

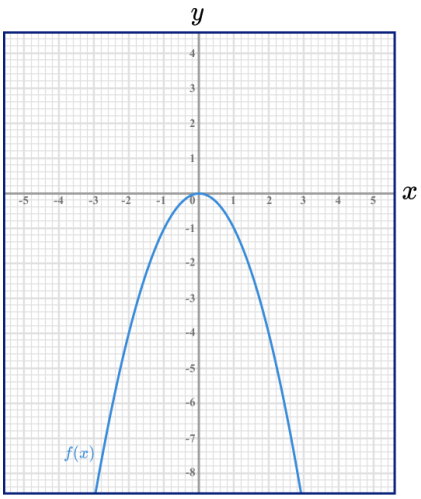
3) $f(-x) + 1$



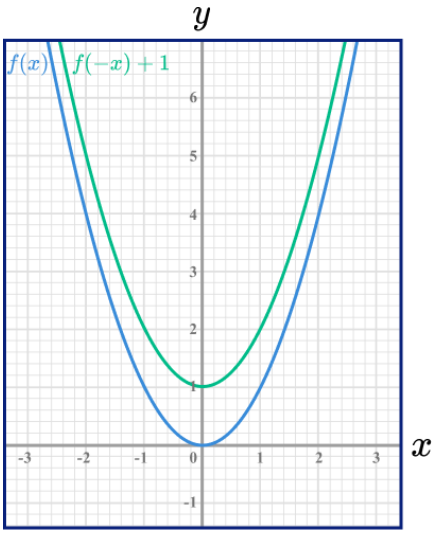
4) $-f(x)$



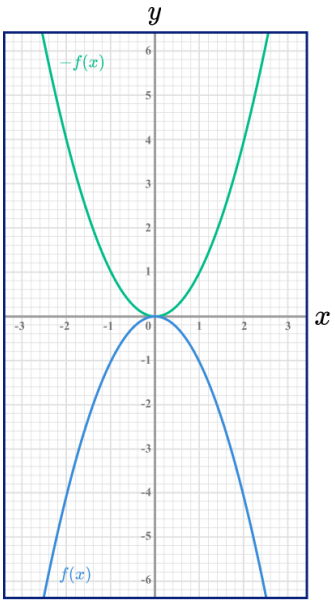
5) $f(-x)$



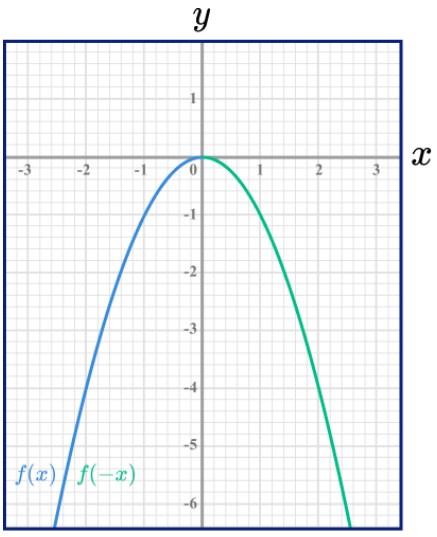
3)



4)



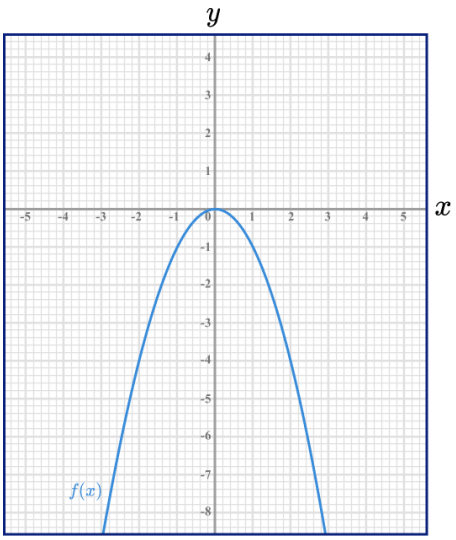
5)



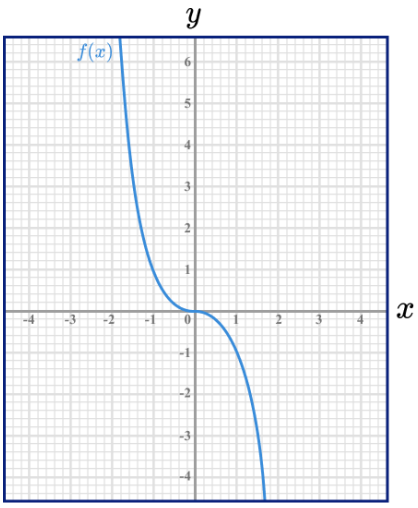
Transformations of Graphs - Answers

Group C contd

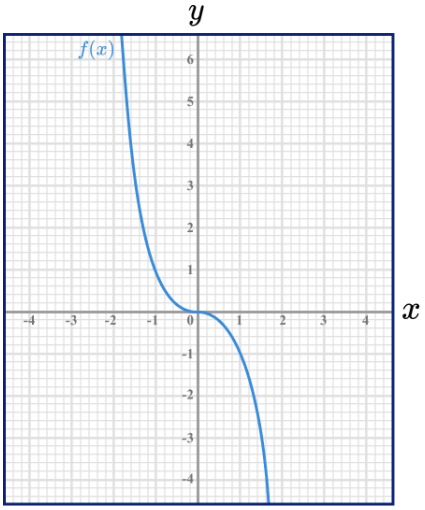
6) $f(-x) + 1$



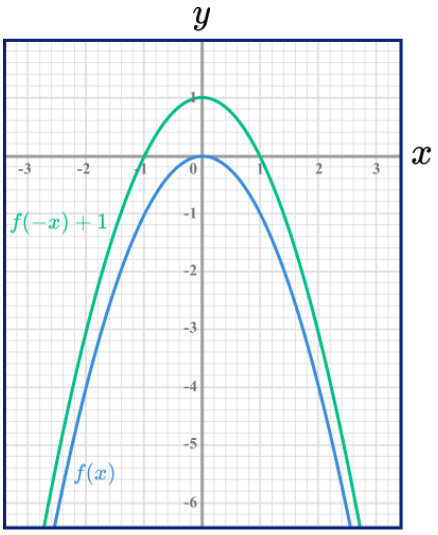
7) $-f(x)$



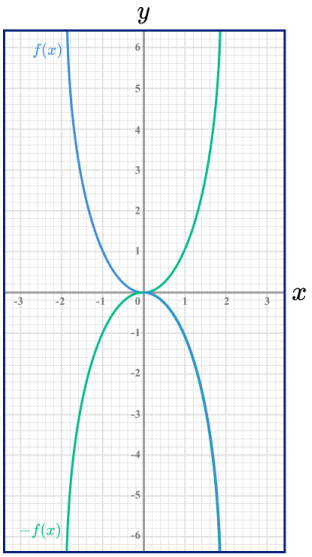
8) $f(-x)$



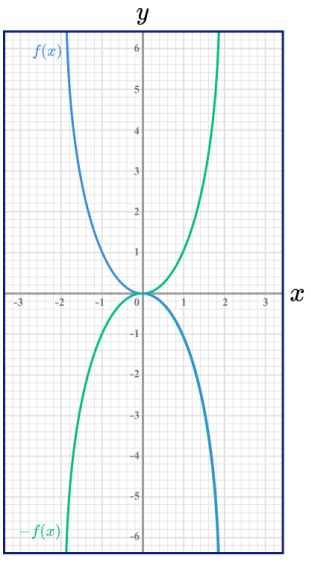
6)



7)



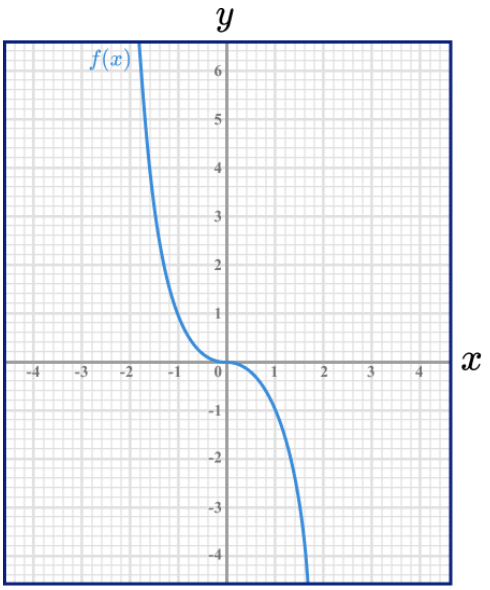
8)



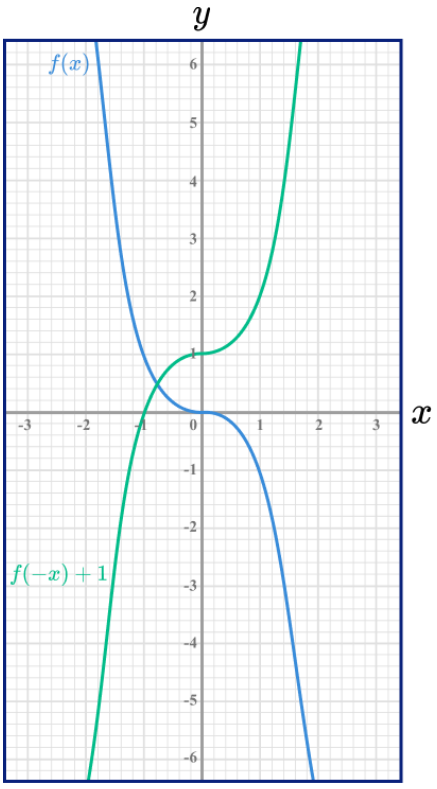
Transformations of Graphs - Answers

Group C contd

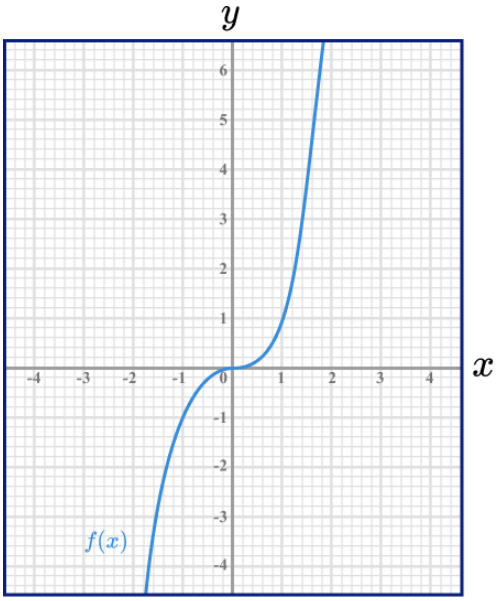
9) $f(-x)+1$



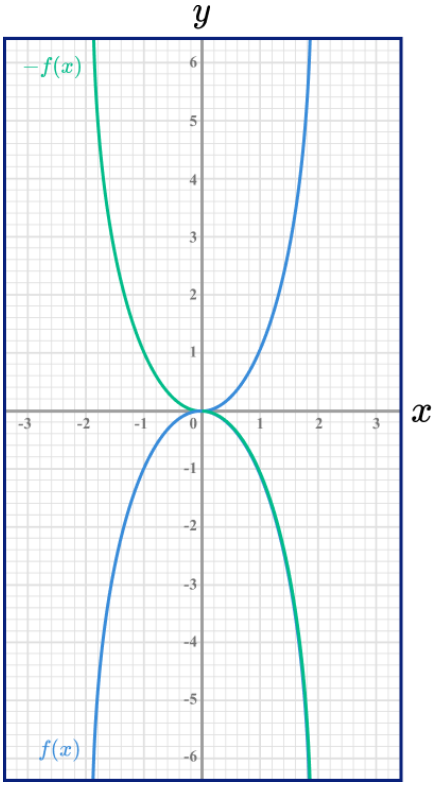
9)



10) $-f(x)$



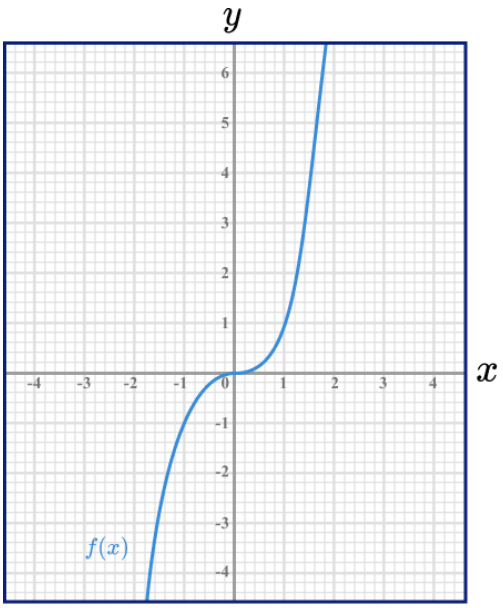
10)



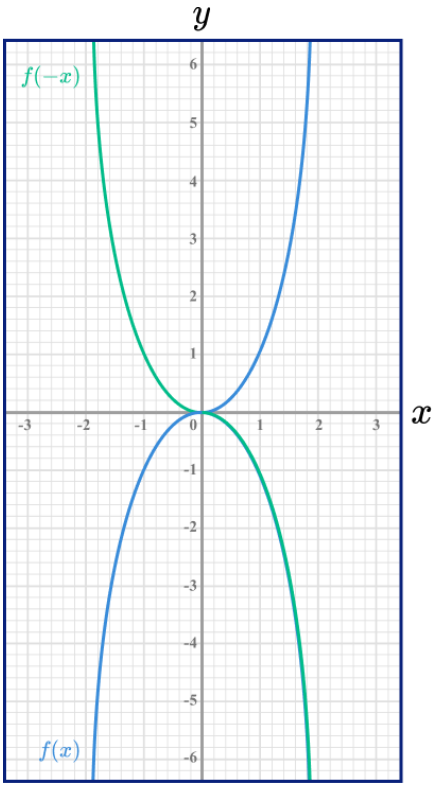
Transformations of Graphs - Answers

Group C contd

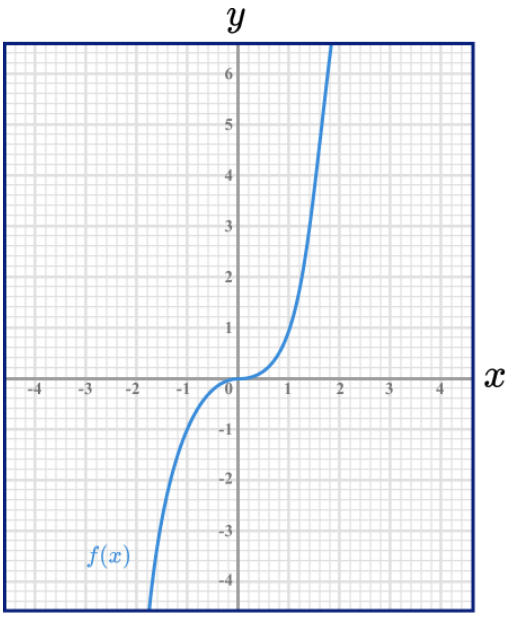
11) $f(-x)$



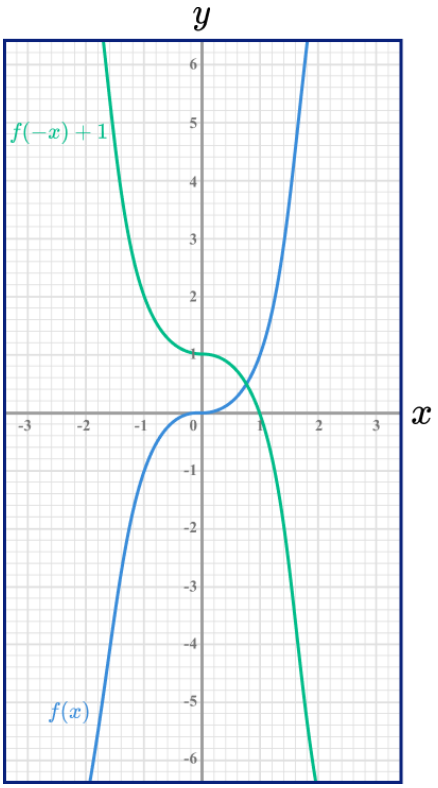
11)



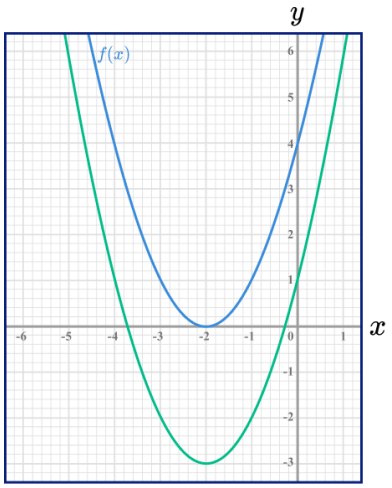
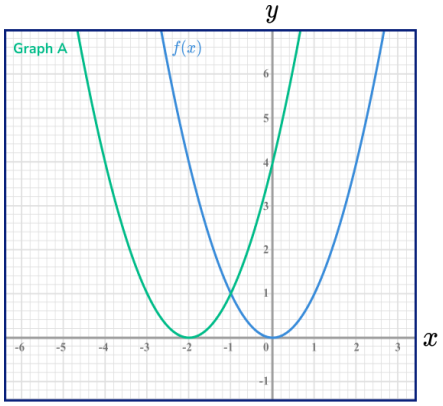
12) $f(-x) + 1$



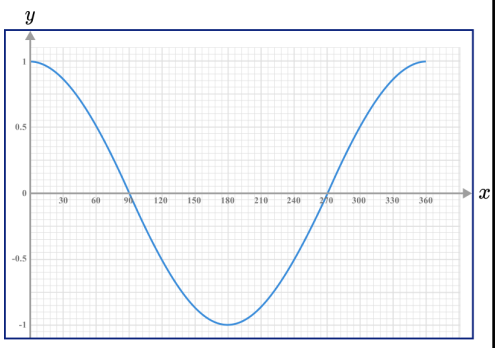
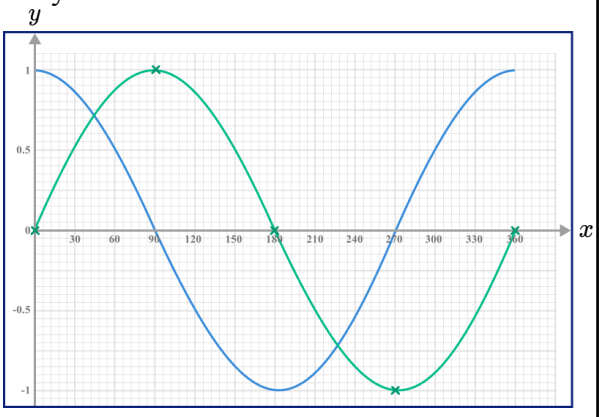
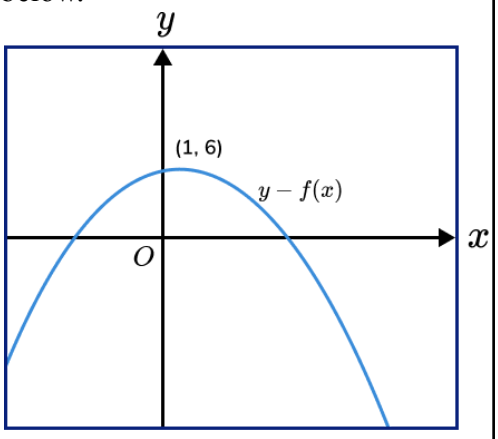
12)



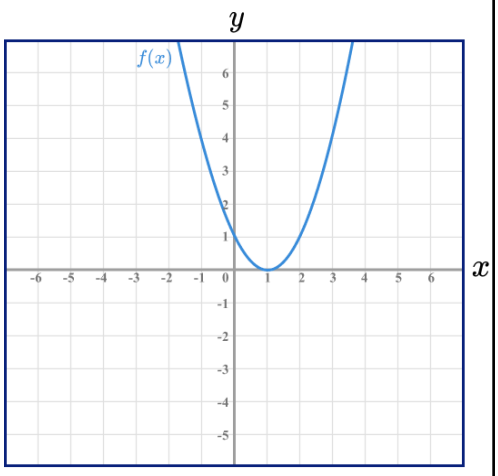
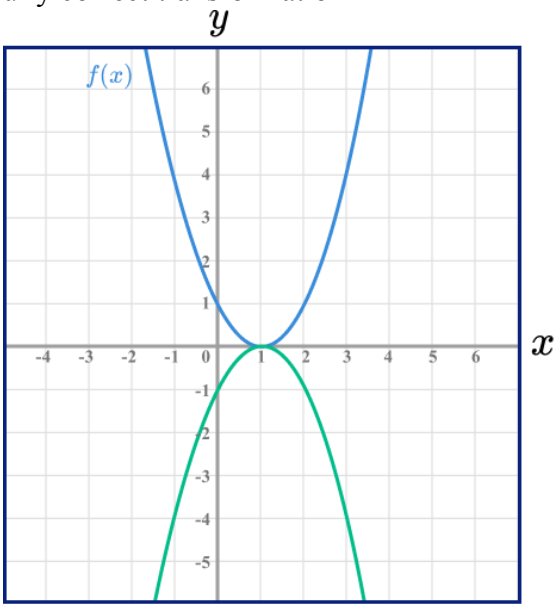
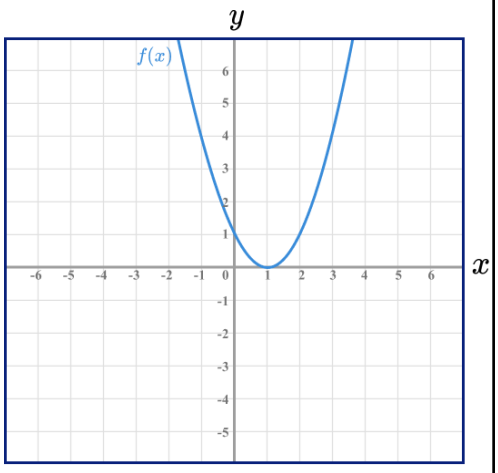
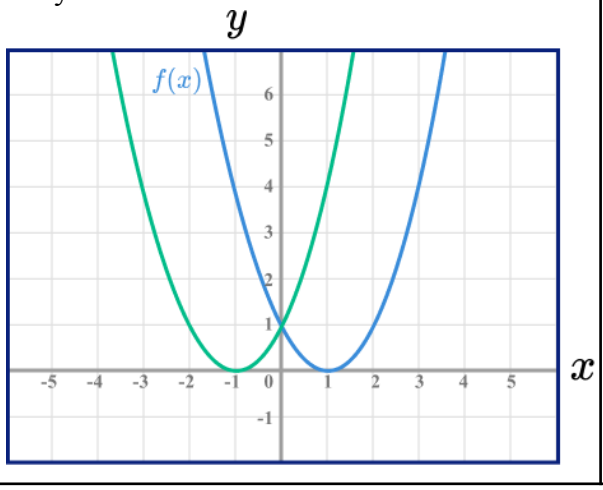
Transformations of Graphs - Answers

	Question	Answer
	Applied Questions	
1)	A curve is drawn with the equation $y = f(x)$ The coordinates of the minimum point of the curve are $(4,\ 3)$. Write down the coordinates of the minimum point of the curve with the equation: **a)** $y = f(x) - 4$ **b)** $y = f(x - 4)$ **c)** $y = -f(x)$	**a)** $(4\,,-1)$ **b)** $(8\,,\ 3)$ **c)** $(4\,,-3)$
2)	 The curve with equation $y = f(x)$ is translated so that the point at $(-2\,,\ 0)$ is mapped onto the point $(-2\,,-3)$ Find an equation of the translated curve.	$y = f(x) - 3$
3)	The graph of $y = f(x)$ is shown on the grid.  Graph A is a translation of the graph $y = f(x)$. Write down the equation of graph A.	$y = f(x + 2)$

Transformations of Graphs - Mark Scheme

	Question	Answer	
	Exam Questions		
1)	Shown below is the graph of $y = \cos(x)$  On the grid, sketch the graph of $y = \cos(x - 90)$ for all values of x from 0° to 360°.	Attempt to translate curve to the right Fully correct transformation 	**(1)** **(1)**
2)	The graph of $y = f(x)$ is shown below.  The coordinates of the turning point of this curve are $(1\ ,\ 6)$. Write down the coordinates of the turning point of the curve with equation		
(a)	$y = f(x + 3)$	**(a)** $(-\ 2\ ,\ 6)$	**(1)**
(b)	$y = -\ f(x)$	**(b)** $(1\ ,-\ 6)$	**(1)**
(c)	$y = f(x) - 3$	**(c)** $(1\ ,\ 3)$	**(1)**
(d)	$y = f(-\ x)$	**(d)** $(-\ 1\ ,6)$	**(1)**

Transformations of Graphs - Mark Scheme

3) **(a)**	The graph of $y = f(x)$ is shown on both grids below.  On the grid above, sketch the graph of $y = -f(x)$	**(a)** Attempt to reflect curve in x axis Fully correct transformation  	**(1)** **(1)**
(b)	 On the grid above, sketch the graph of $y = f(x + 2)$	**(b)** Attempt to translate curve to the left Fully correct transformation  	**(1)** **(1)**