

Edexcel GCSE

Mathematics (Linear) – 1MA0

TRANSFORMATION OF GRAPHS

Materials required for examination

Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser.
Tracing paper may be used.

Items included with question papers

Nil

**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.

Calculators may be used.

Information

The marks for each question are shown in brackets – use this as a guide as to how much time to spend on **each** question.

Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed – you should take particular care on these questions with your spelling, punctuation and grammar, as well as the clarity of expression.

Advice

Read each question carefully before you start to answer it.

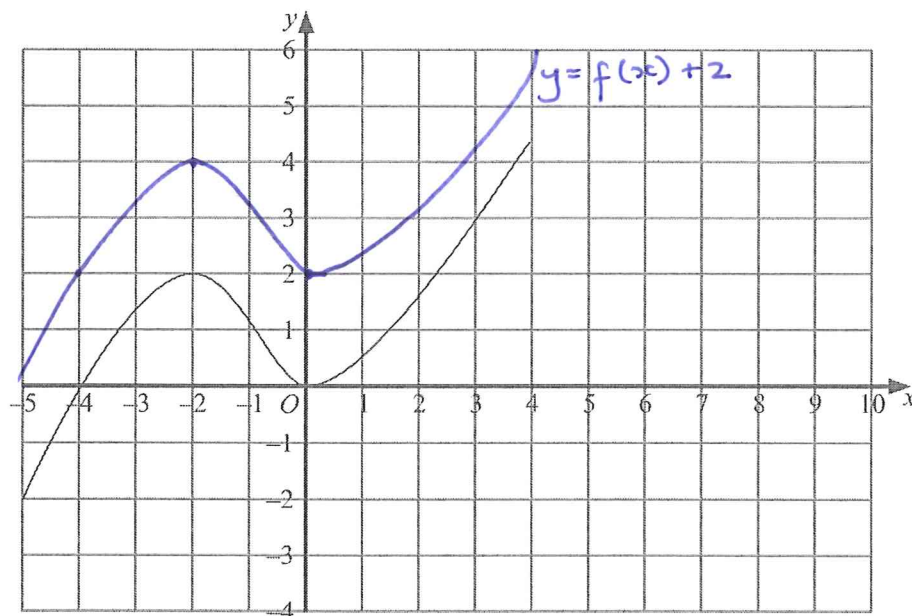
Keep an eye on the time.

Try to answer every question.

Check your answers if you have time at the end.

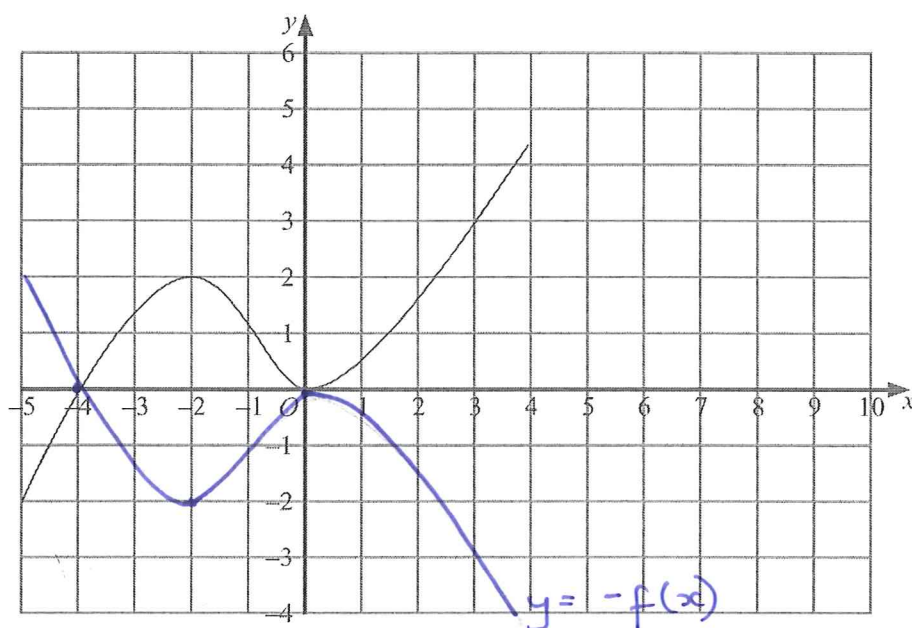
1. The graph of $y = f(x)$ is shown on the grids.

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



(2)

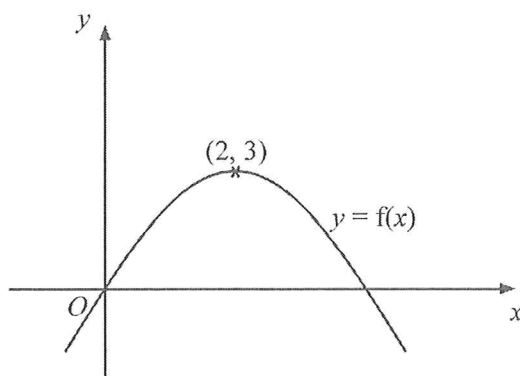
(b) On this grid, sketch the graph of $y = -f(x)$



(2)

(4 marks)

2.



The diagram shows part of the curve with equation $y = f(x)$.
The coordinates of the maximum point of this curve are $(2, 3)$.

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

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

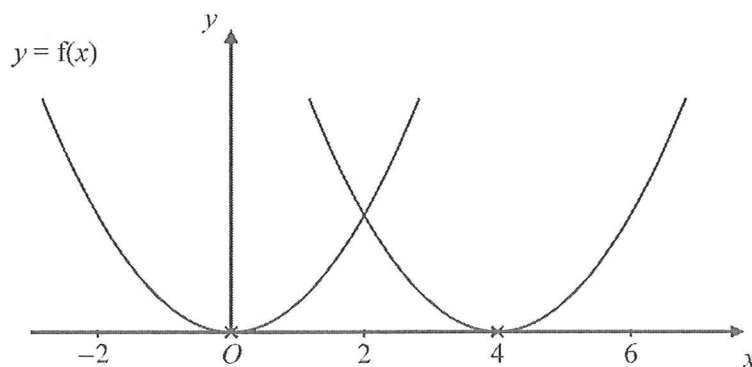
(4 , 3) (1)

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

(2 , 6) (1)

(2 marks)

3.



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

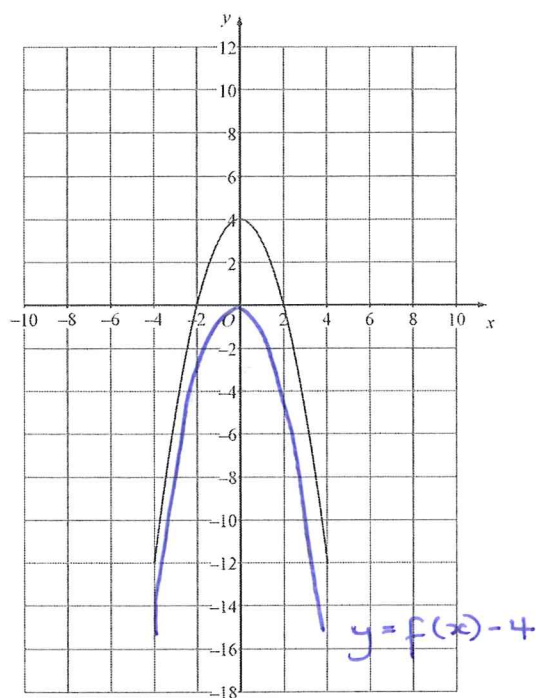
Find an equation of the translated curve.

$y = f(x - 4)$

(2 marks)

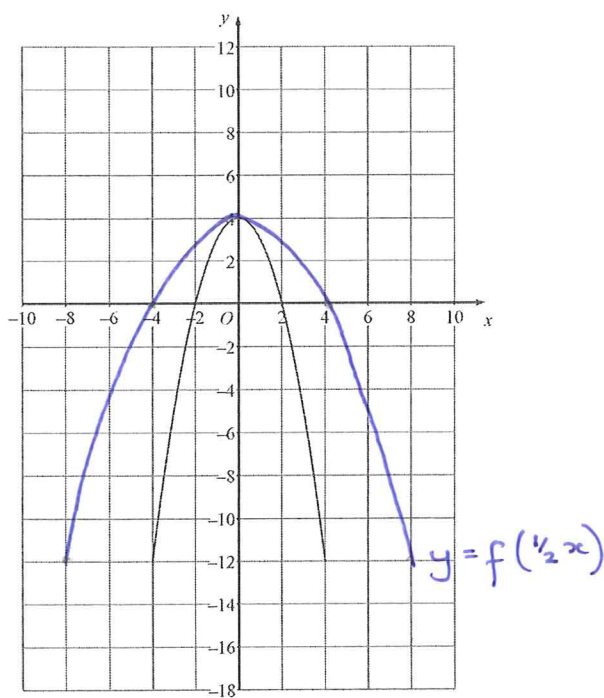
4. The graph of $y = f(x)$ is shown on the grids.

(a) On this grid, sketch the graph of $y = f(x) - 4$



(2)

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

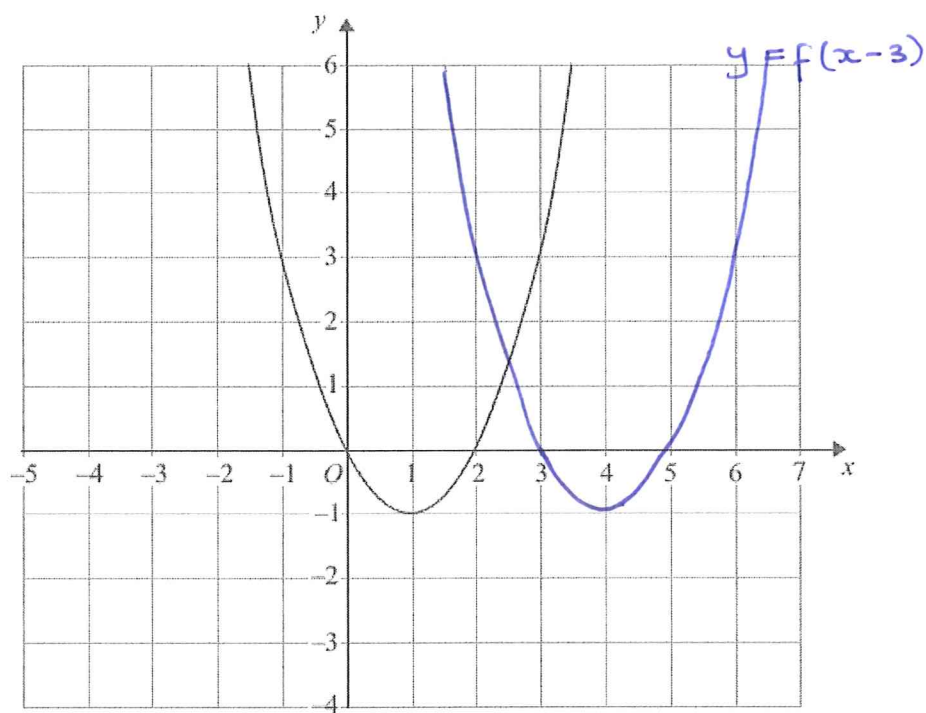


(2)

(4 marks)

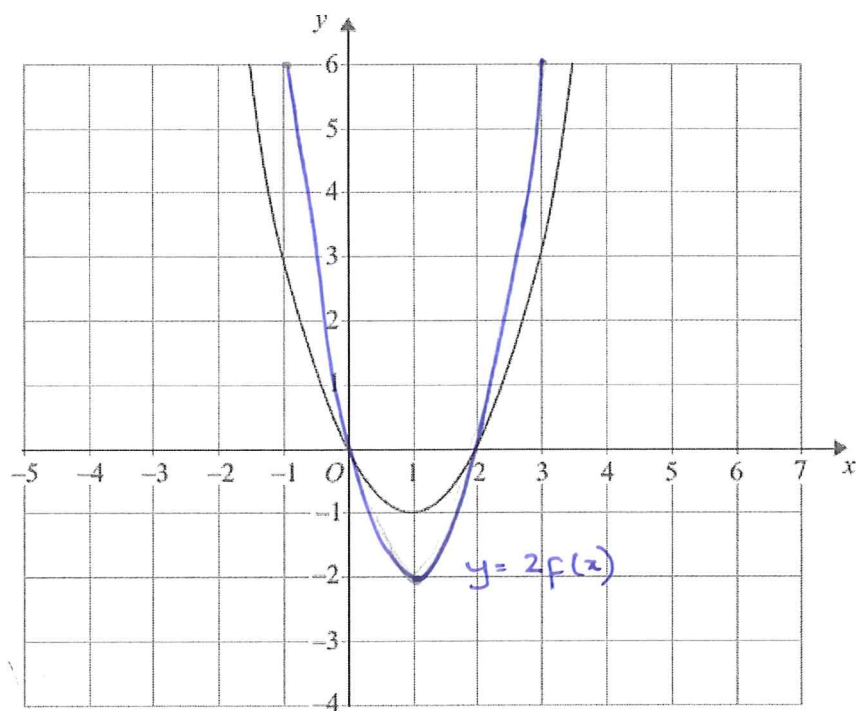
5. The graph of $y = f(x)$ is shown on each of the grids.

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



(2)

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

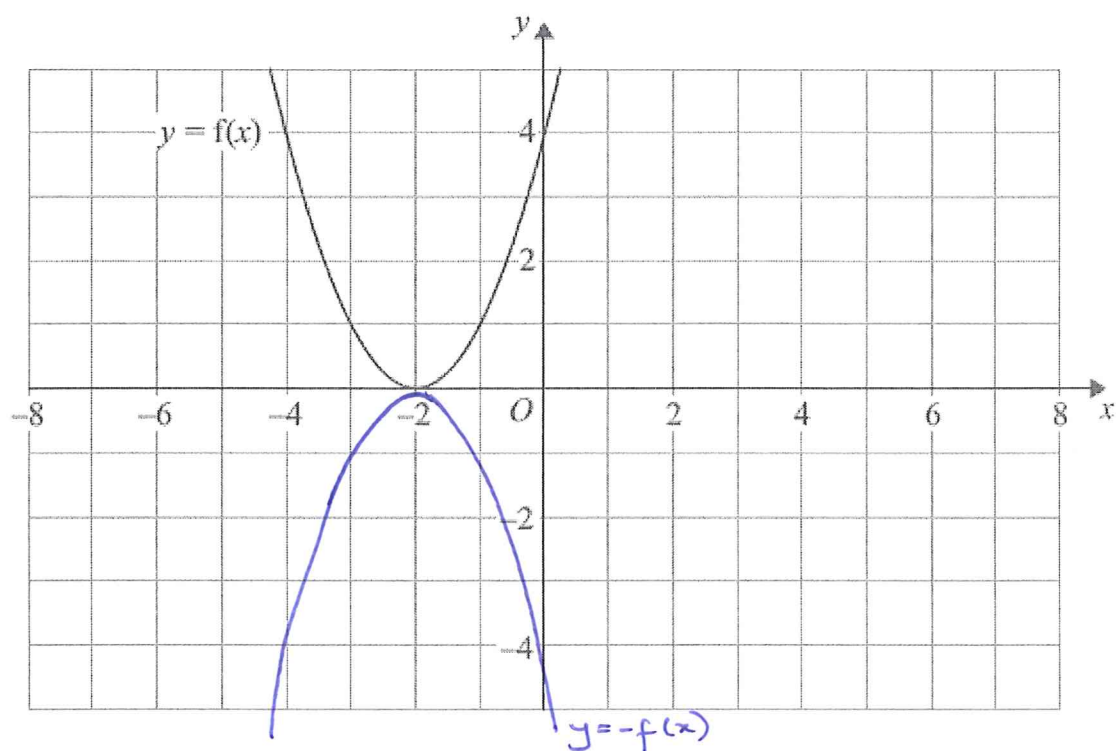


(2)

(4 marks)

6. $y = f(x)$

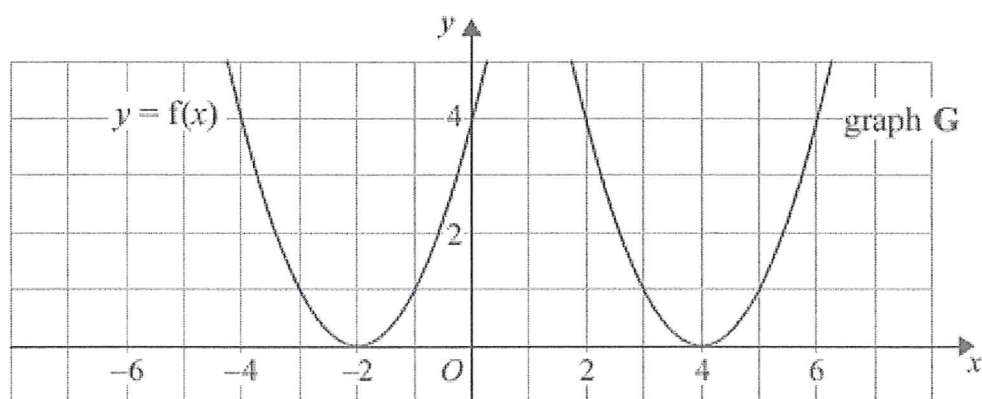
The graph of $y = f(x)$ is shown on the grid.



(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 $y = f(x)$.

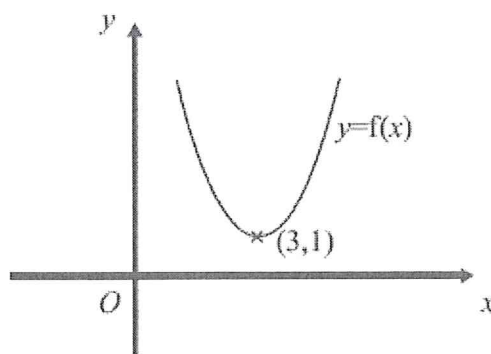
(b) Write down the equation of graph G.

$y = f(x - 4)$

(2)

(4 marks)

7.



The diagram shows part of the curve with equation $y = f(x)$.
The coordinates of the minimum point of this curve are $(3, 1)$.

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

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

(1)

(...3..., ...4...)

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

(1)

(...5..., ...1...)

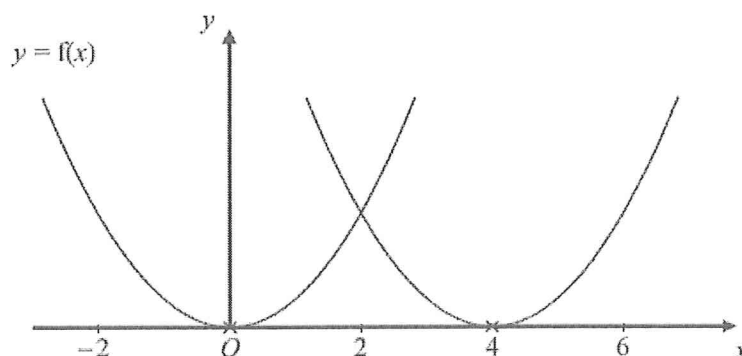
(c) $y = f\left(\frac{1}{2}x\right)$

(1)

(...6..., ...1...)

(3 marks)

8.



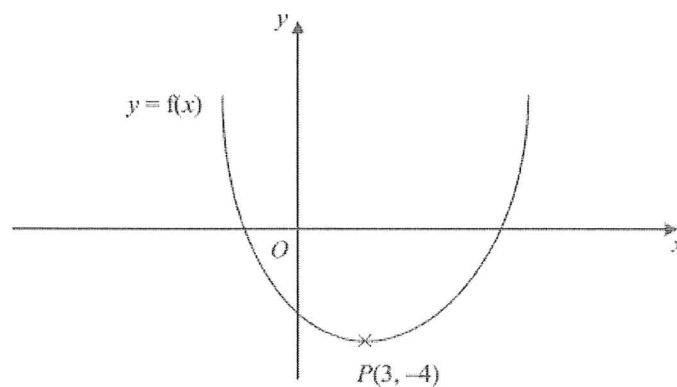
The curve with equation $y = f(x)$ is translated so that the point at $(0, 0)$ is mapped onto the point $(4, 0)$.

Find an equation of the translated curve.

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

(2 marks)

9. 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)

(4 marks)