Name	Class

MATHS TEACHER HUB

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Transformation of graphs

(9 – 1) Topic booklet

Higher

These questions have been collated from previous years GCSE Mathematics papers.

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser.	Total Marks

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*.
•Diagrams are NOT accurately drawn, unless otherwise indicated.
•You must **show all your working out.**
•If the question is a **1H** question you are not allowed to use a calculator.
•If the question is a **2H** or a **3H** question, you may use a calculator to help you answer.

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*.

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.

Answer ALL questions
Write your answers in the space provided.
You must write down all the stages in your working.

15 The graph of the curve C with equation $y = f(x)$ is transformed to give the graph of the curve S with equation $y = f(-x) - 3$

The point on C with coordinates (7, 2) is mapped to the point Q on S.

Find the coordinates of Q.

(..... , ...)

June 2019 – Paper 3H **(Total for Question 15 is 2 marks)**

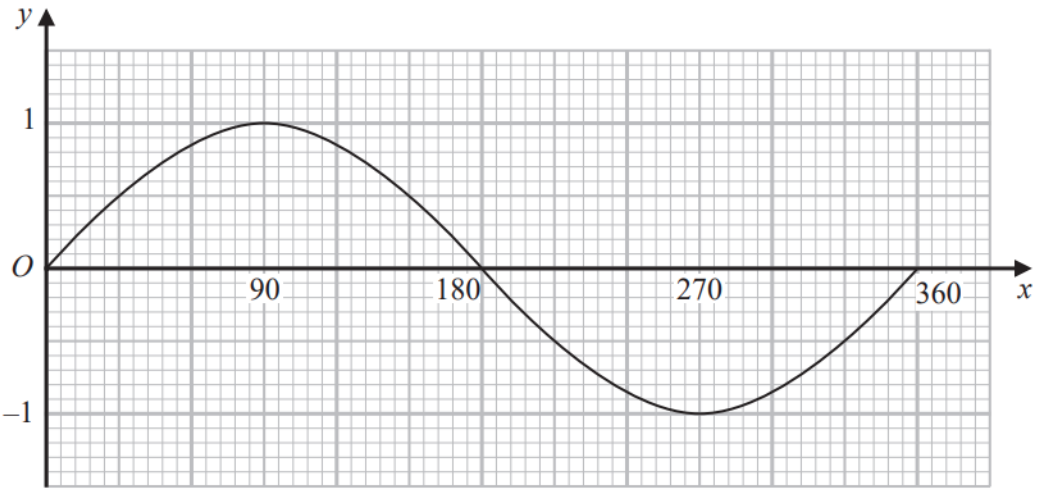
16 The graph of $y = f(x)$ is transformed to give the graph of $y = -f(x + 3)$
The point A on the graph of $y = f(x)$ is mapped to the point P on the graph of $y = -f(x + 3)$

The coordinates of point A are (9, 1)
Find the coordinates of point P.

(..... , ...)

Specimen 1 – Paper 3H **(Total for Question 16 is 2 marks)**

18 Here is a graph of $y = \sin x°$ for $0 \leqslant x \leqslant 360$



(a) Using this graph, find estimates of all **four** solutions of

$$\sin x° = 0.6 \quad \text{for } 0 \leqslant x \leqslant 720$$

.....

(2)

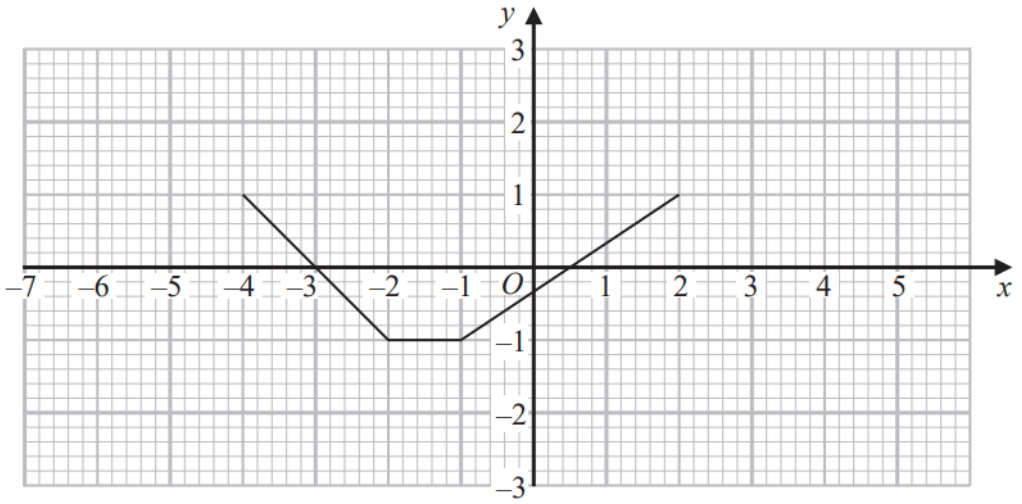
The graph of $y = \sin x°$ is reflected in the x-axis.

(b) Write down an equation of the reflected graph.

.....

(1)

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

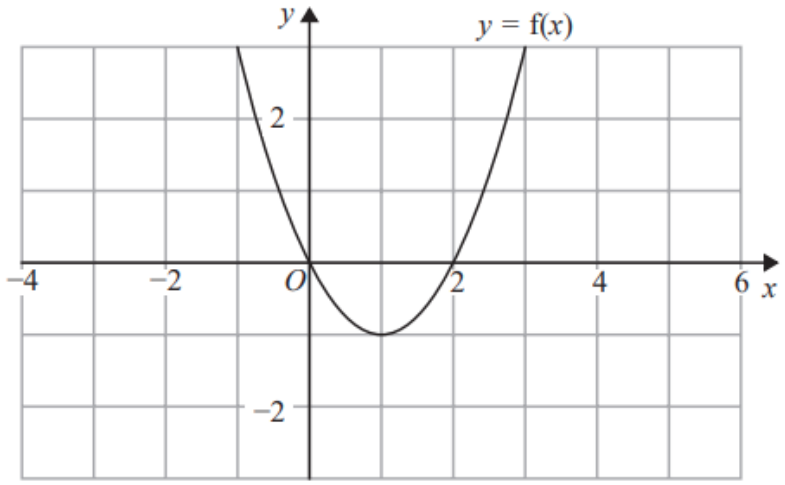


(c) On the grid, draw the graph of $y = f(x – 2)$

(1)

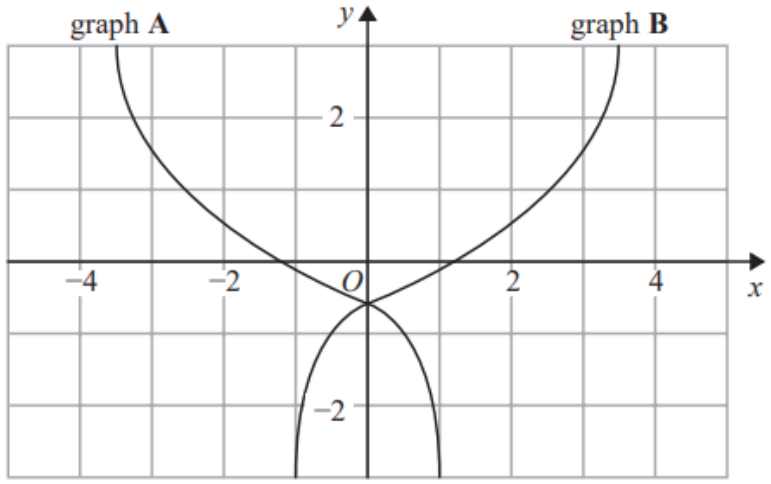
(Total for Question 18 is 4 marks)

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



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

(1)



On the grid, graph **A** has been reflected to give graph **B**.

The equation of graph **A** is $y = g(x)$

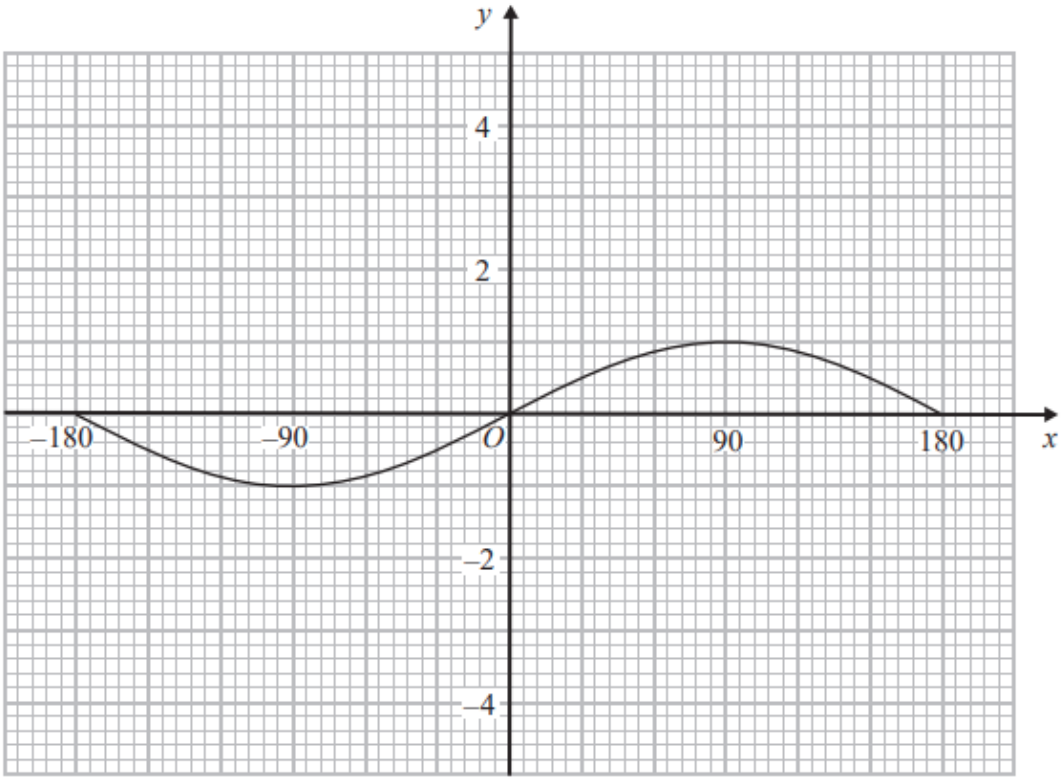
(b) Write down the equation of graph **B**.

.....

(1)

November 2018 – Paper 1H **(Total for Question 18 is 2 marks)**

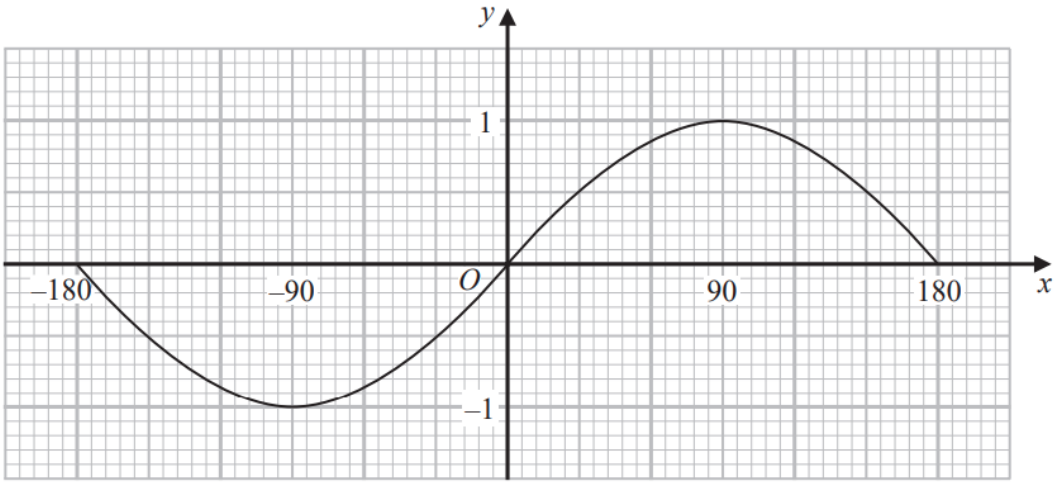
18 Here is the graph of $y = \sin x°$ for $-180 \leqslant x \leqslant 180$



On the grid, sketch the graph of $y = \sin x° - 2$ for $-180 \leqslant x \leqslant 180$

June 2018 – Paper 1H **(Total for Question 18 is 2 marks)**

19 Here is the graph of $y = \sin x°$ for $-180 \leqslant x \leqslant 180$



(a) Use the graph to find estimates for the solutions of

$$\sin x° = 0.3 \quad \text{for } -180 \leqslant x \leqslant 180$$

.....

(2)

(b) Write down a value of x such that

$$\sin(x + 20)° = 0 \quad \text{for } -180 \leqslant x \leqslant 180$$

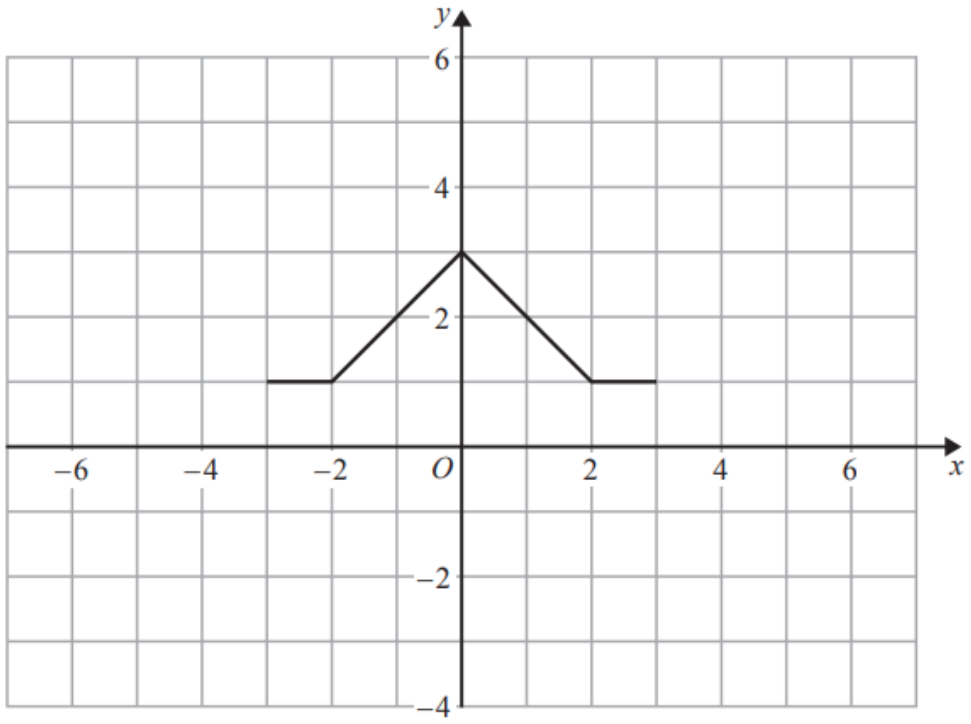
$x =$ .....

(1)

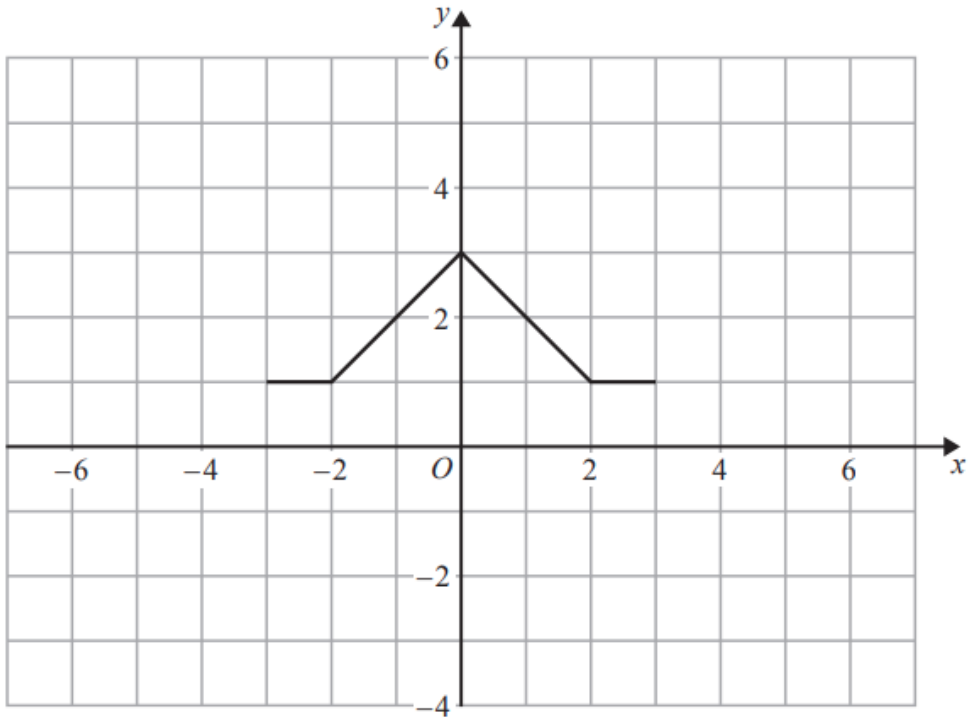
(Total for Question 19 is 3 marks)

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

(i) On this grid, draw the graph of $y = 2f(x)$



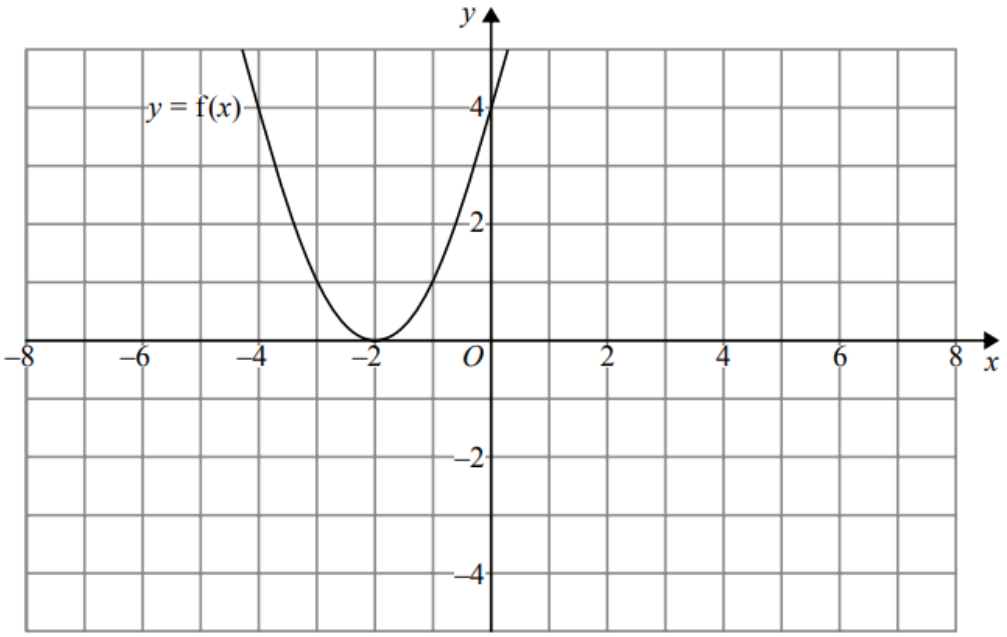
(ii) On the grid below, draw the graph of $y = f(x - 3)$



(2)

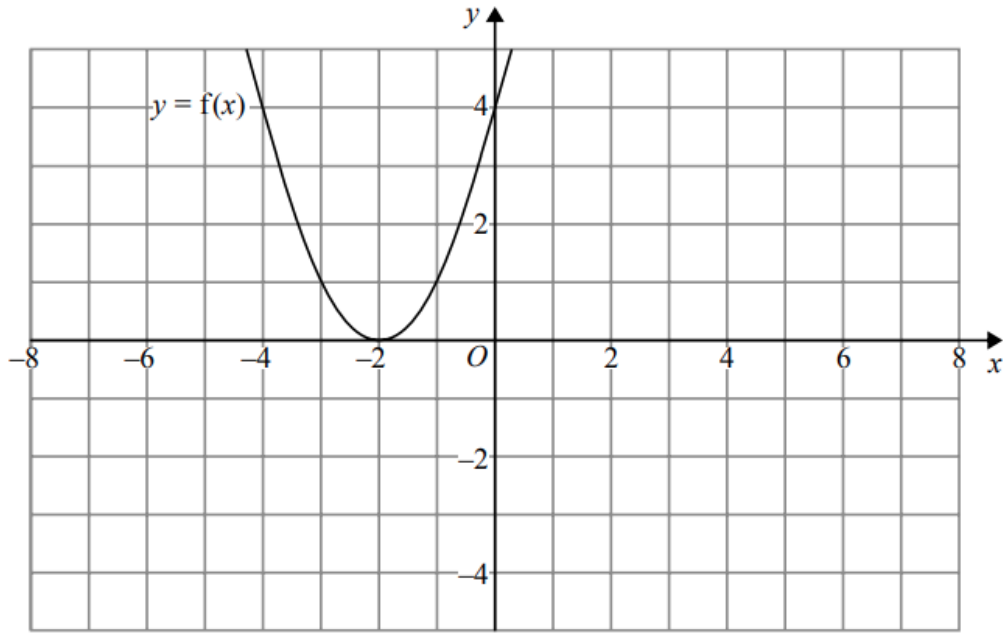
(Total for Question 19 is 2 marks)

19 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 for Question 19 is 2 marks)

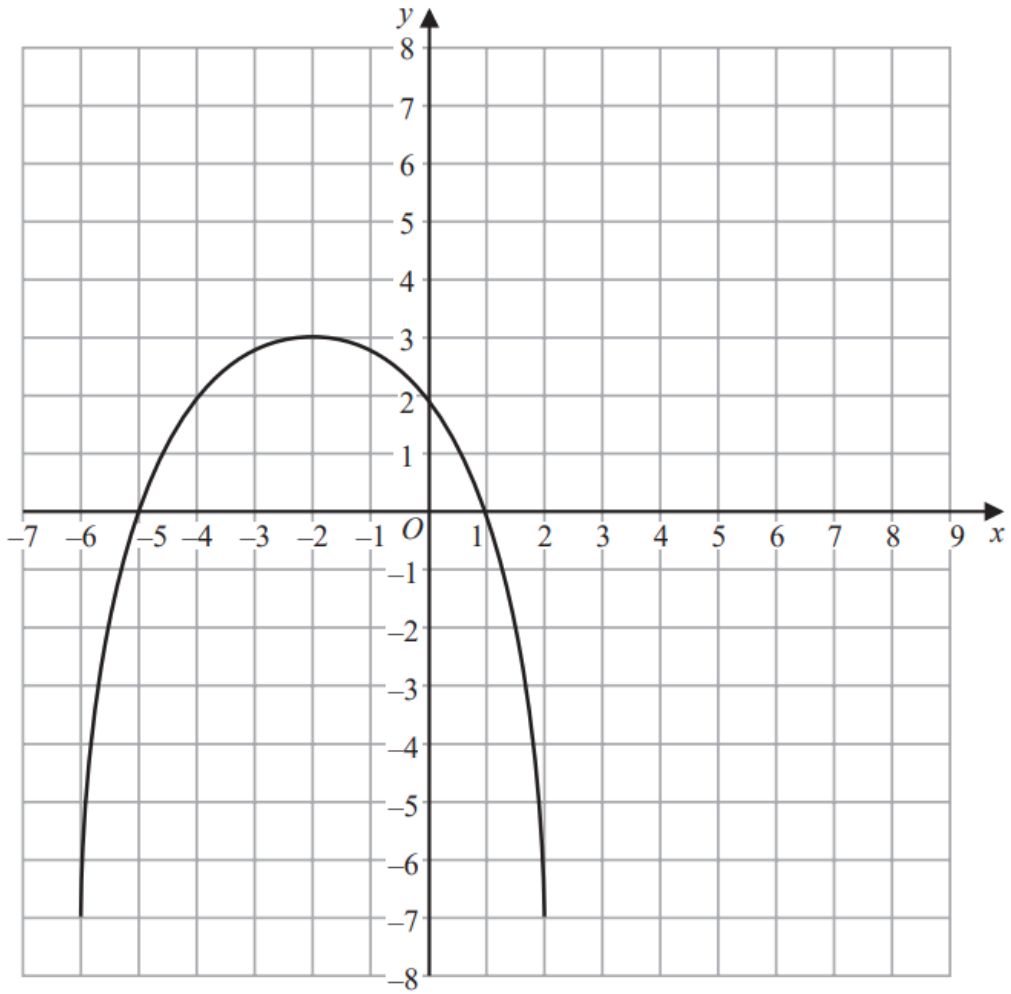
20 The turning point on the graph of $y = g(x)$ has coordinates $(-3, 6)$

(a) Write down the coordinates of the turning point on the graph of $y = g(x - 7)$

(..... , ...)

(1)

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

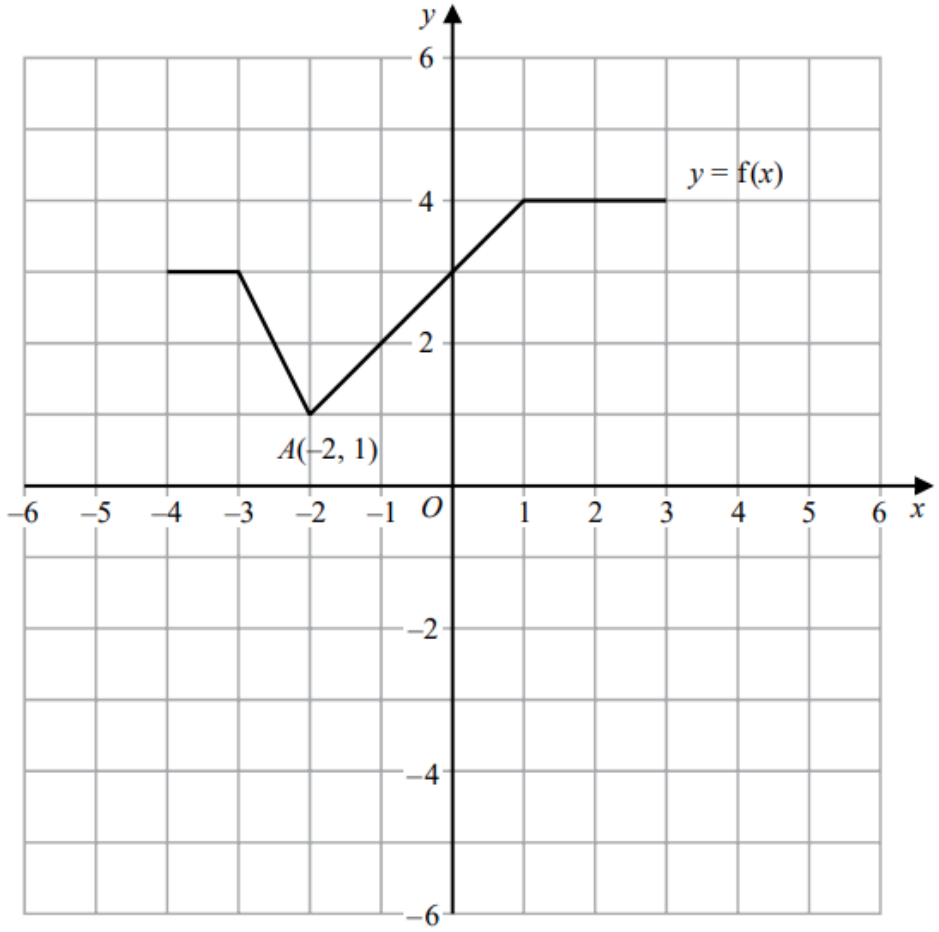


(b) On the grid, sketch the graph of $y = f(-x) + 3$

(2)

(Total for Question 20 is 3 marks)

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



(a) On the grid, draw the graph with equation $y = f(x + 1) - 3$

(2)

Point $A(-2, 1)$ lies on the graph of $y = f(x)$.

When the graph of $y = f(x)$ is transformed to the graph with equation $y = f(-x)$, point A is mapped to point B.

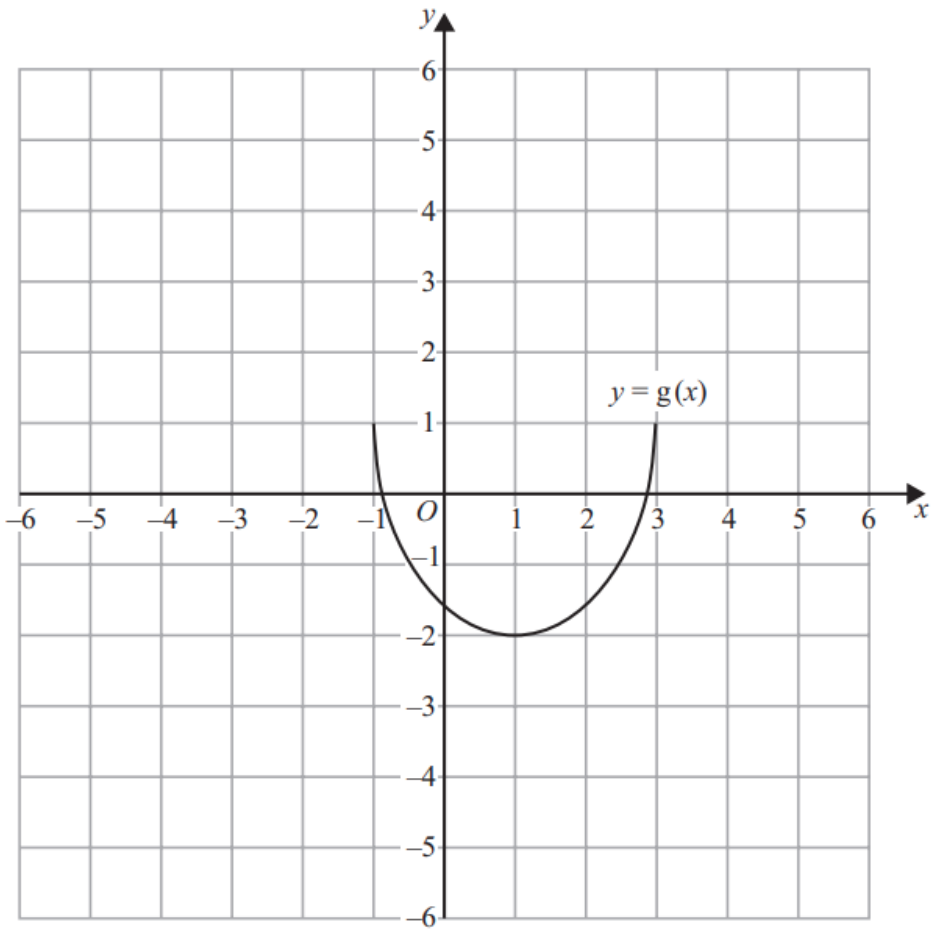
(b) Write down the coordinates of point B.

(..... , ...)

(1)

(Total for Question 20 is 3 marks)

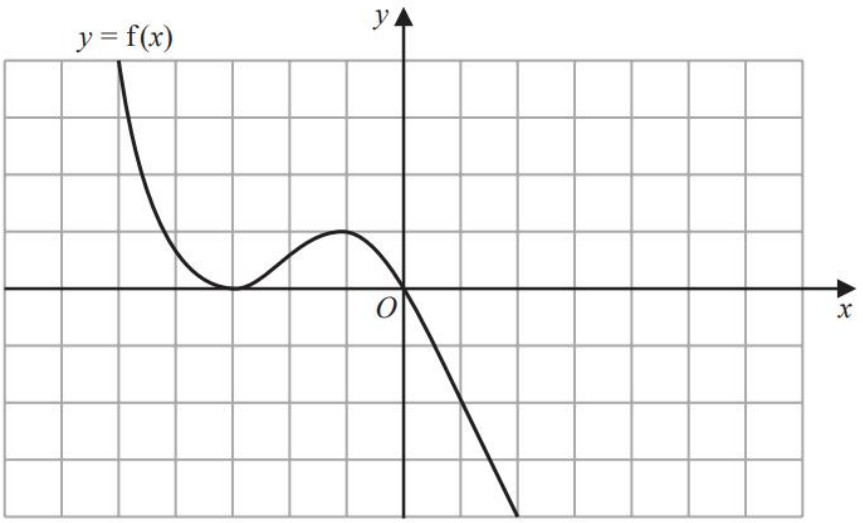
21 The graph of $y = g(x)$ is shown on the grid.



On the grid, draw the graph of $y = g(-x) + 2$

(Total for Question 21 is 2 marks)

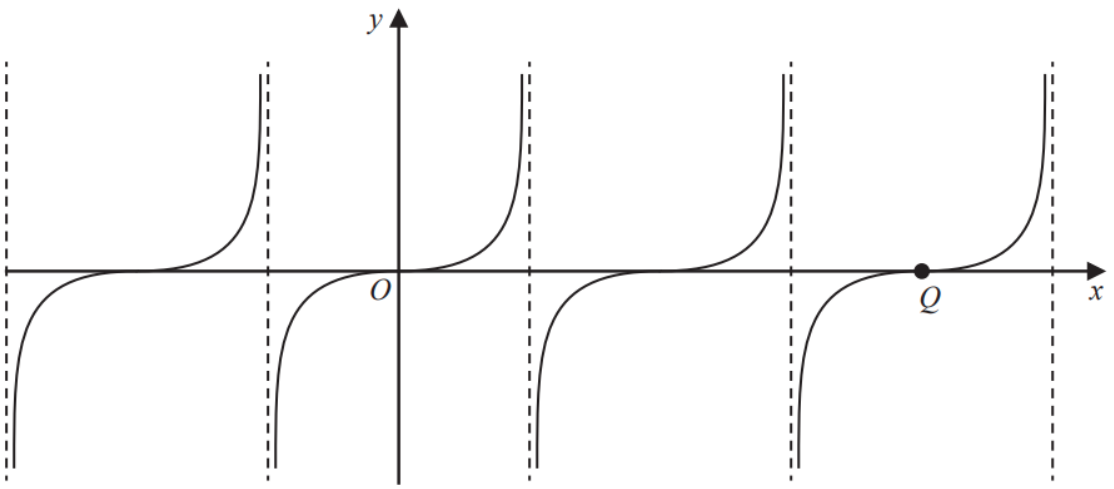
21 The graph of $y = f(x)$ is shown on the grid below.



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

(1)

Here is a sketch of the graph of $y = \tan x°$



The graph of $y = \tan x°$ is translated to give the graph of $y = g(x)$

Following the translation the point Q, shown on the graph above, moves to point R.
Point R has coordinates $(90, -5)$

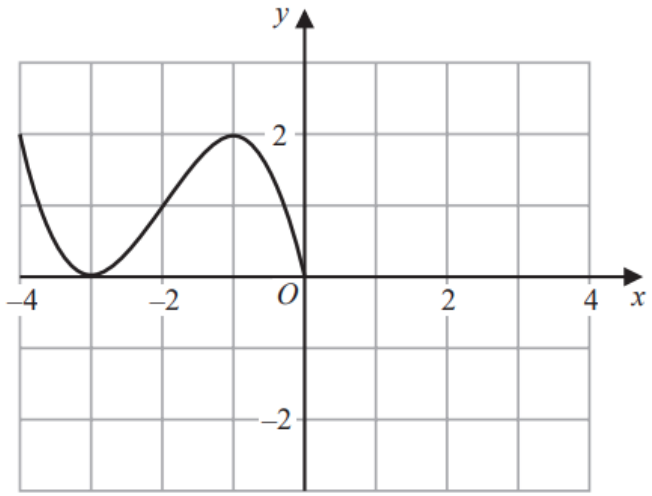
(b) Find an expression for $g(x)$ in terms of x.

.....

(2)

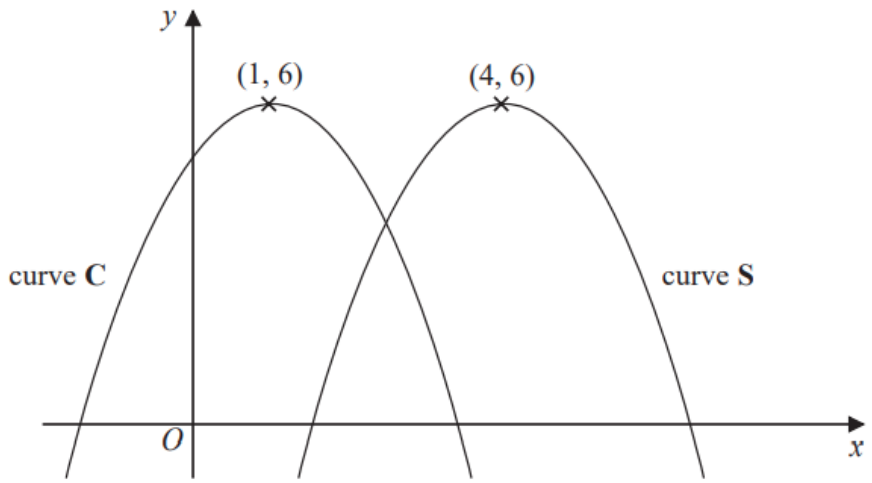
(Total for Question 21 is 3 marks)

21 The graph of the curve with equation $y = f(x)$ is shown on the grid below.



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

(2)



The curve **C** with equation $y = 5 + 2x - x^2$ is transformed by a translation to give the curve **S** such that the point (1, 6) on **C** is mapped to the point (4, 6) on **S**.

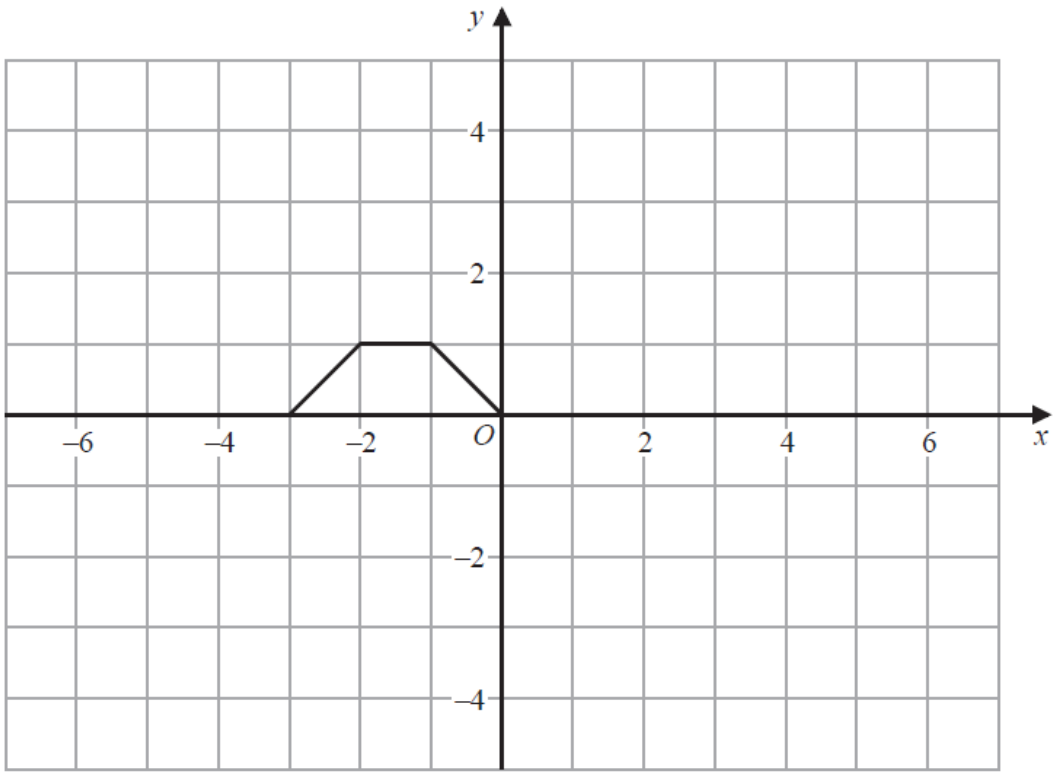
(b) Find an equation for **S**.

.....

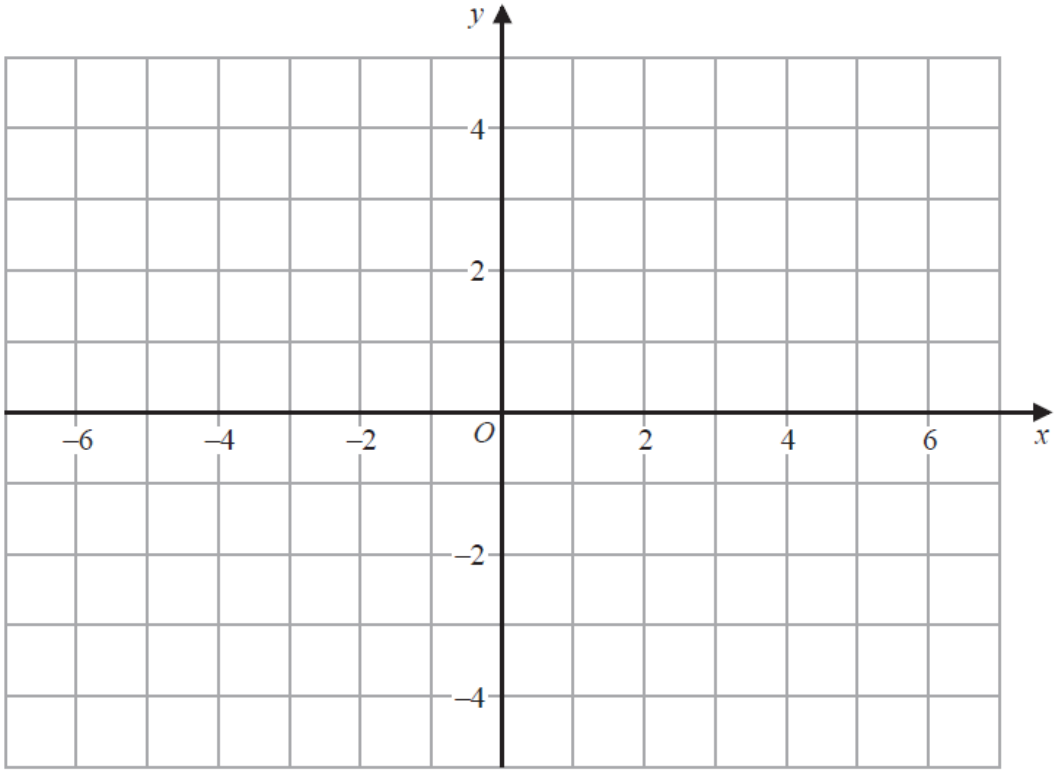
(2)

(Total for Question 21 is 4 marks)

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

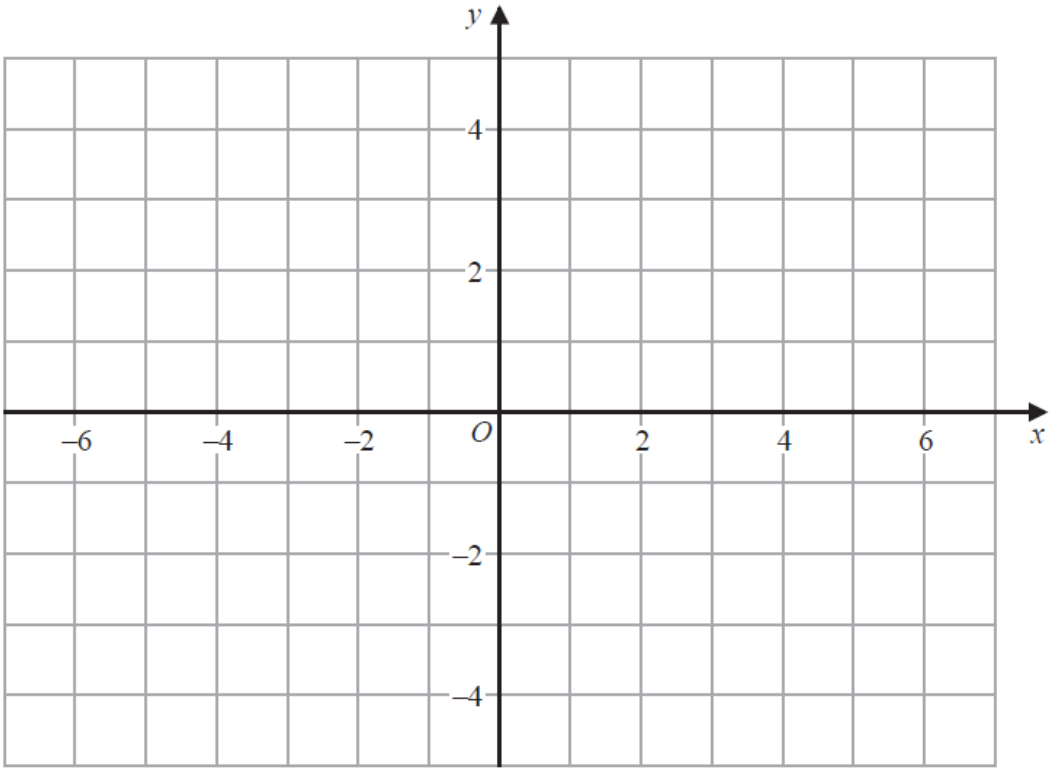


(a) On the grid below, draw the graph of $y = f(x) - 4$



(1)

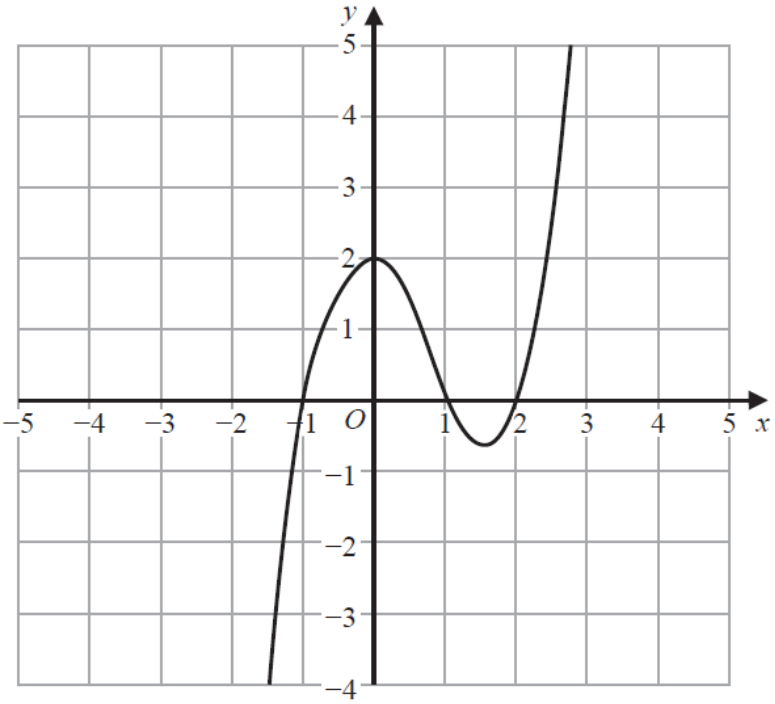
(b) On the grid below, draw the graph of $y = f(-x)$



(1)

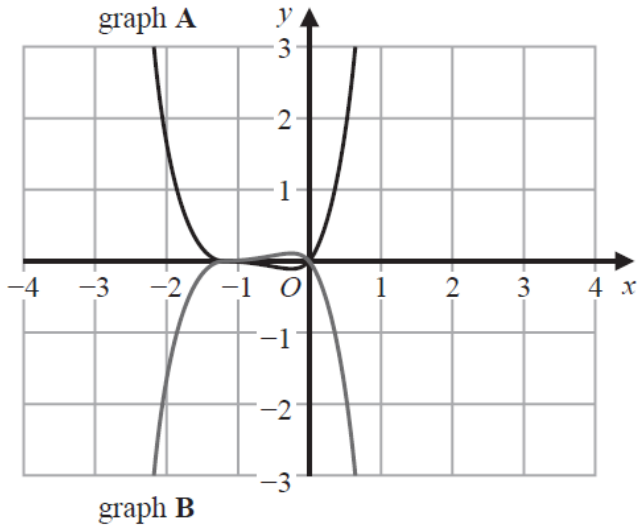
June 2023 – Paper 2H **(Total for Question 21 is 2 marks)**

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



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

(1)



On this grid, graph **A** has been reflected to give graph **B**.
The equation of graph **A** is $y = g(x)$

(b) Write down an equation of graph **B**.

.....

(1)

(Total for Question 23 is 2 marks)