Level 3 Algebra · Transformation of Functions

June 2013 - Question 17

Jan 2014 - Question 13

Jan 2015 - Question 18

June 2015 - Question 16

Jan 2016 - Question 18

June 2016 - Question 14

Jan 2017 - Question 18

June 2017 - Question 20

Jan 2018 - Question 18

June 2018 - Question 18

Jan 2019 - Question 15

June 2019 - Question 20

Jan 2020 - Question 16

Jan 2021 - Question 18

Jan 2022 - Question 18

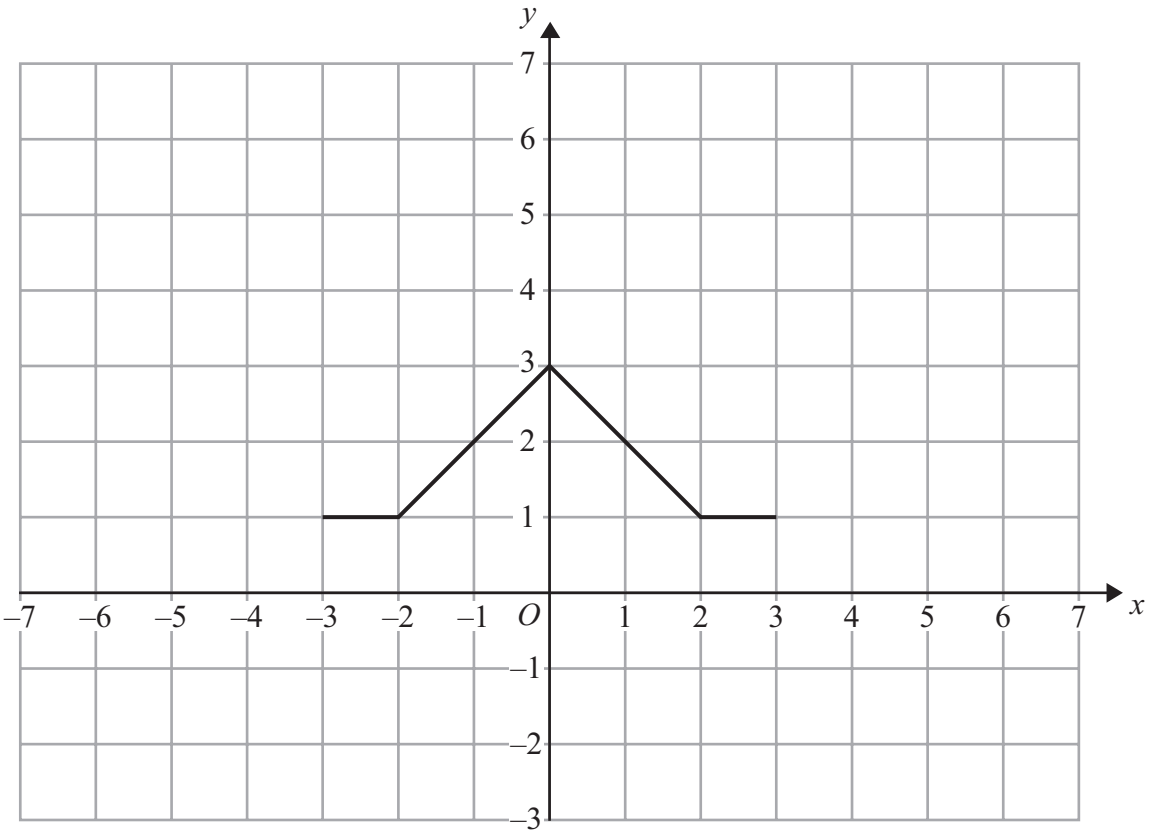
June 2022 - Question 20

Jan 2023 - Question 17

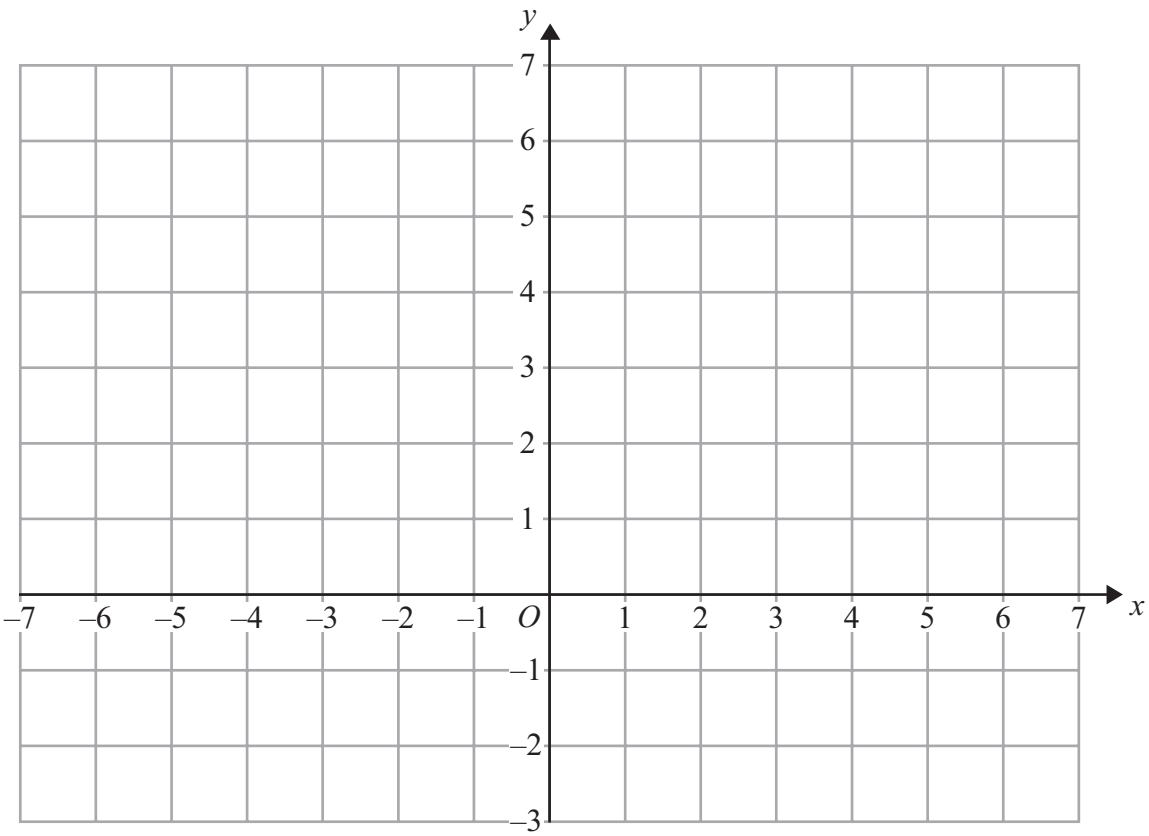
June 2023 - Question 17

Jan 2024 - Question 20

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

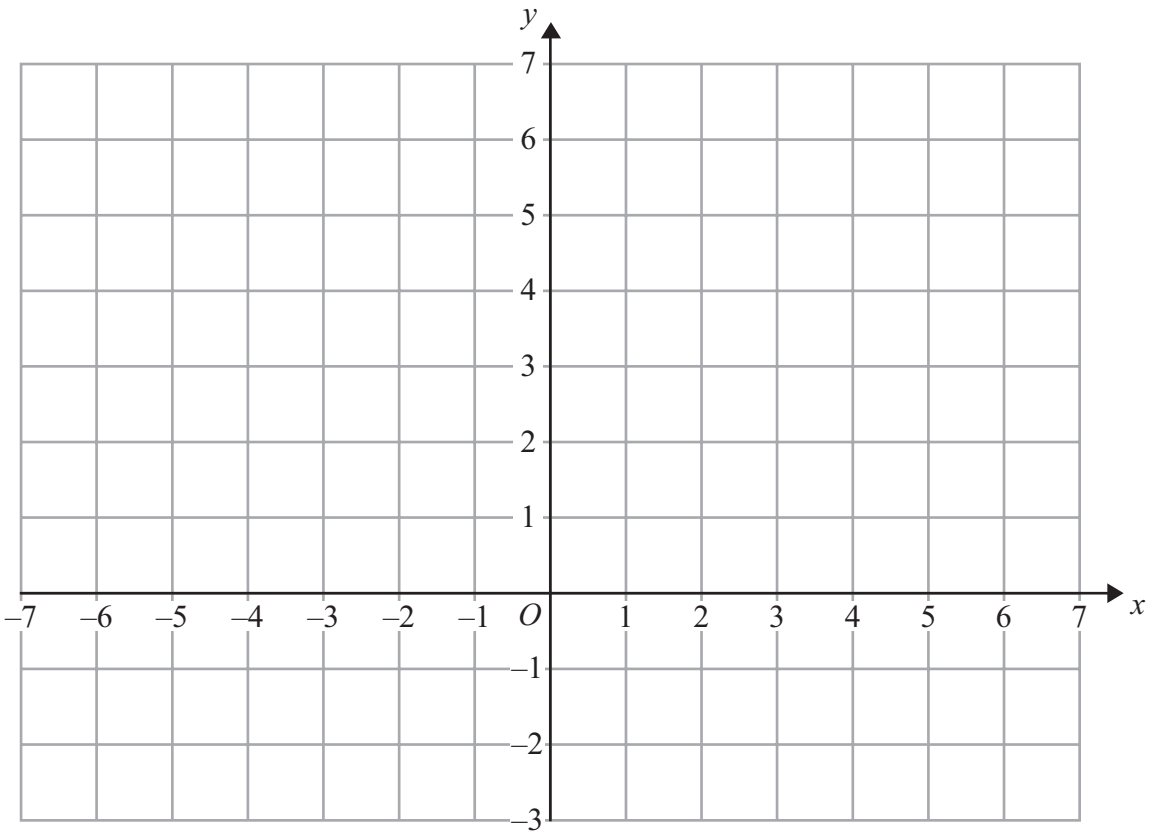


(a) On the grid below, draw the graph of $y = 2f(x)$.



(2)

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

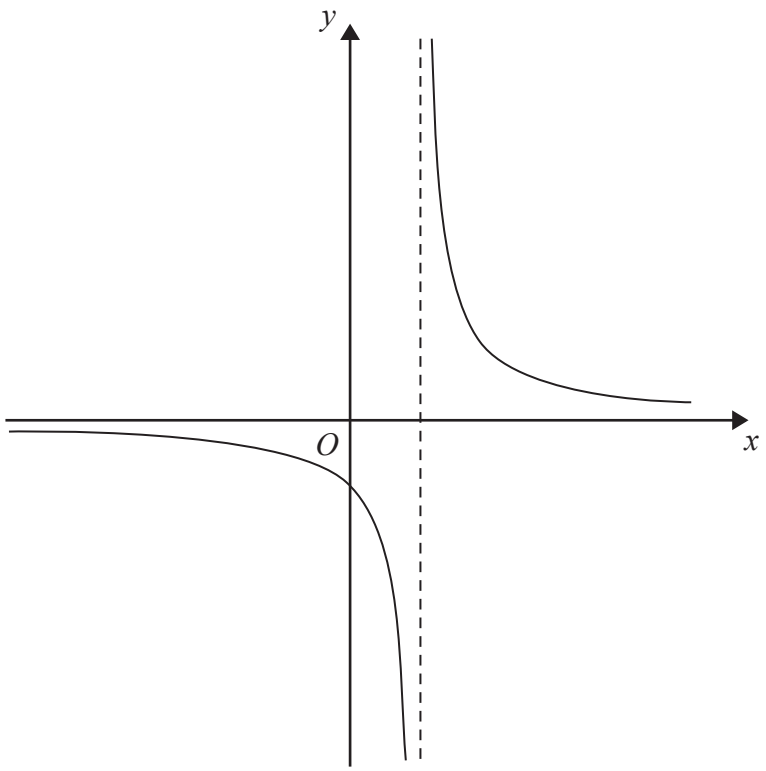


(2)

(Total for Question 17 is 4 marks)

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

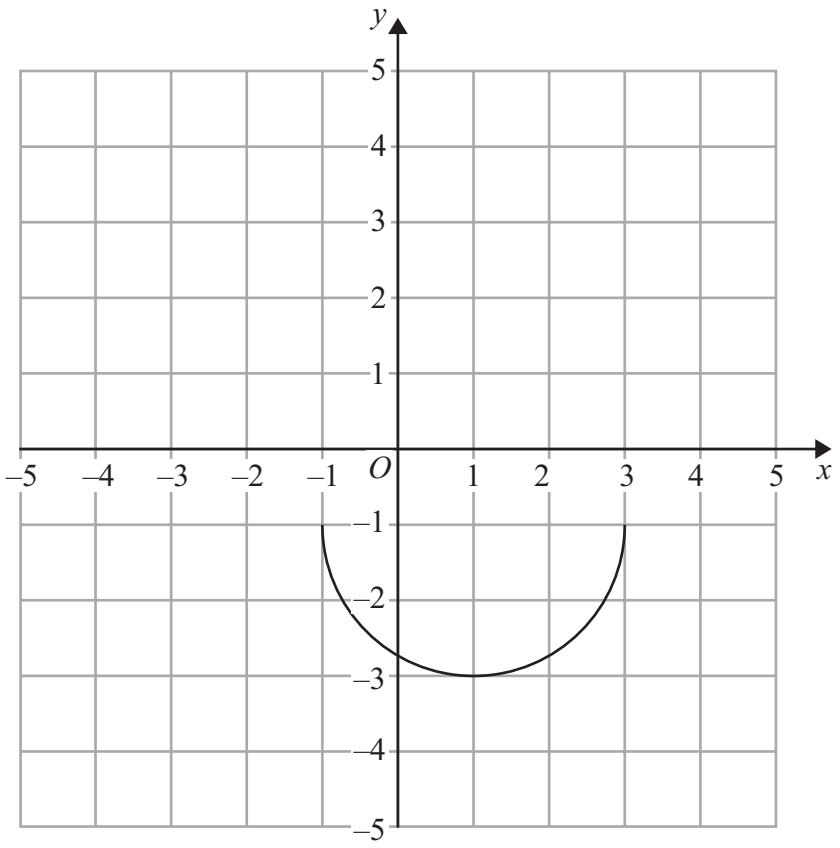
The graph passes through the point with coordinates $(0, -\frac{1}{2})$ and has two asymptotes $x = 2$ and $y = 0$



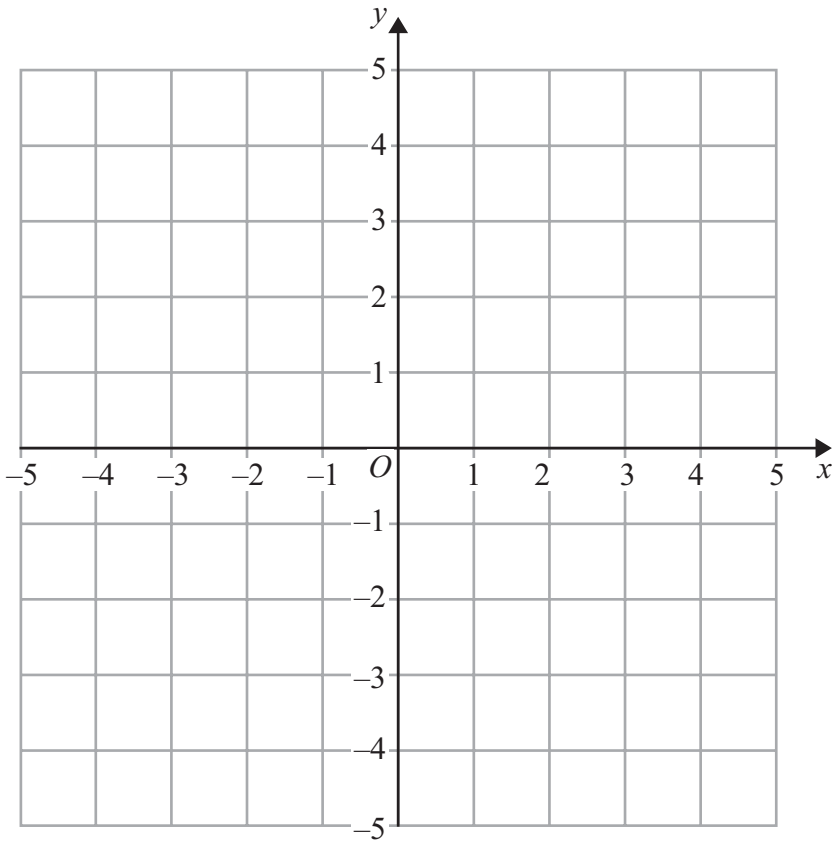
In the space opposite, sketch the graph of $y = f(\frac{1}{2}x)$.

State the equations of the asymptotes of this curve and show the coordinates of any points where the graph of $y = f(\frac{1}{2}x)$ intersects the axes.

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

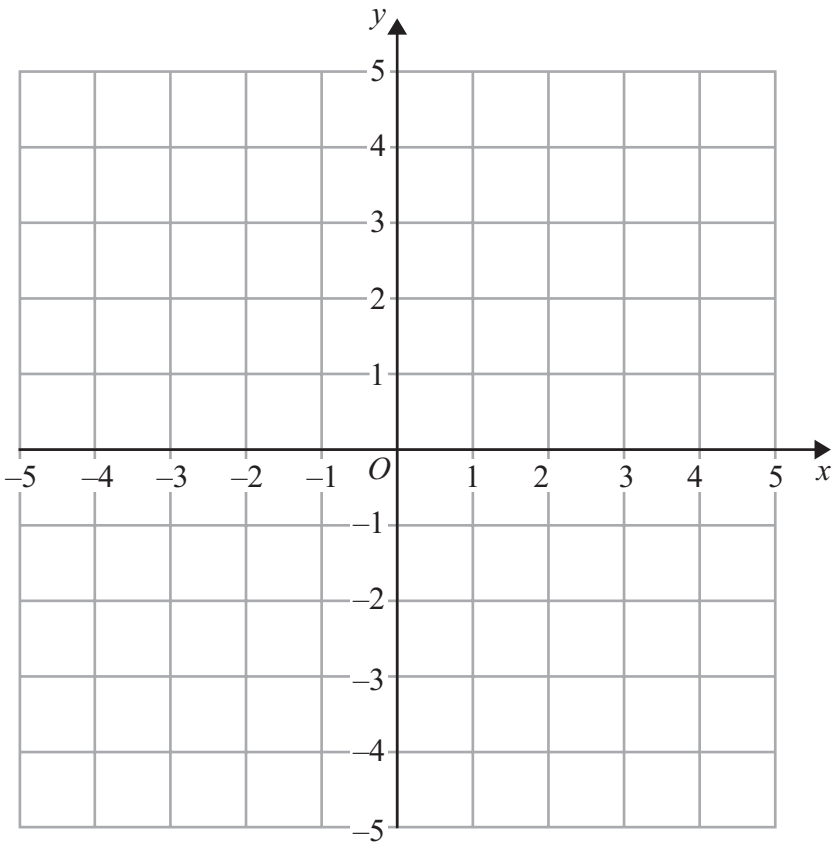


(a) On the grid below, draw the graph of $y = -f(x)$.



(2)

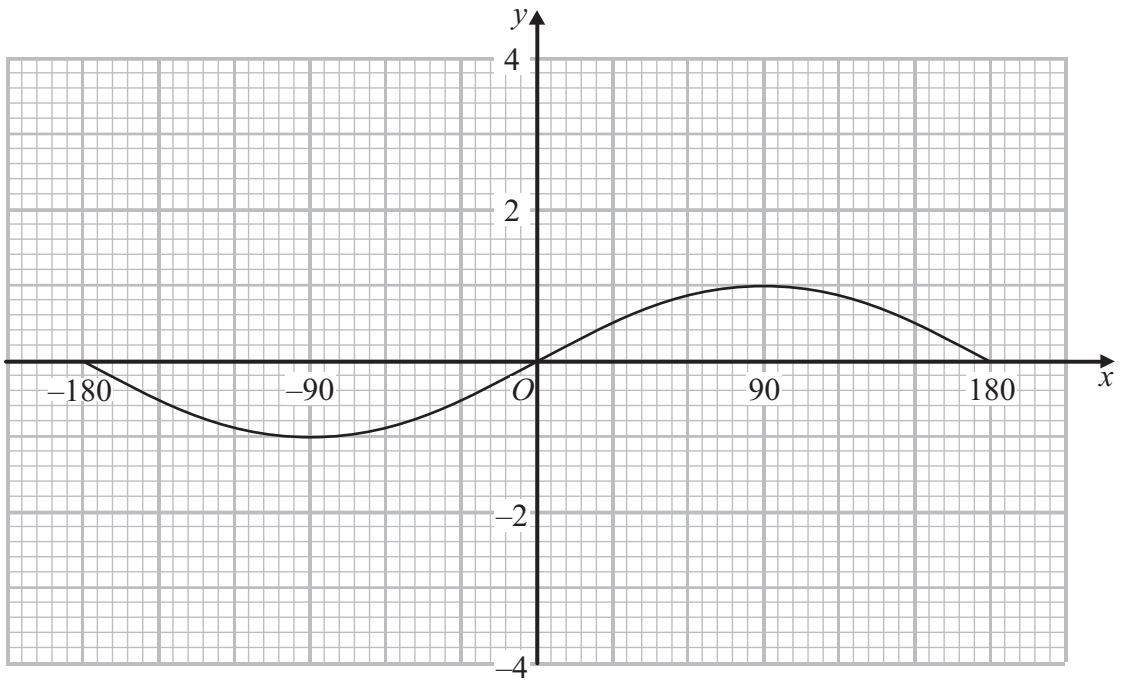
(b) On the grid below, draw the graph of $y = f(x + 2)$.



(2)

(Total for Question 18 is 4 marks)

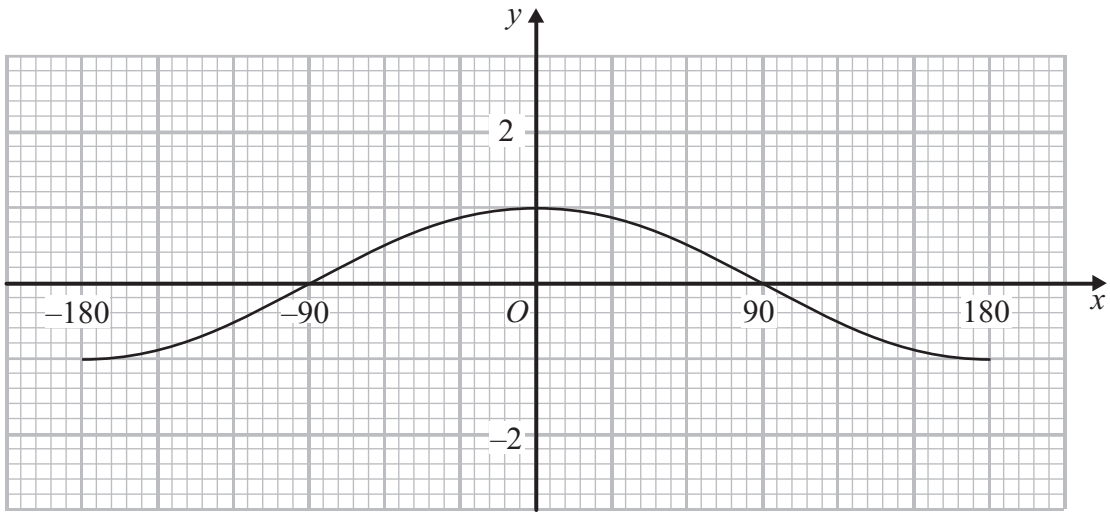
16 Here is the graph of $y = \sin x°$ for $-180 \leqslant x \leqslant 180$



(a) On the grid above, sketch the graph of $y = 3\sin x°$ for $-180 \leqslant x \leqslant 180$

(2)

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

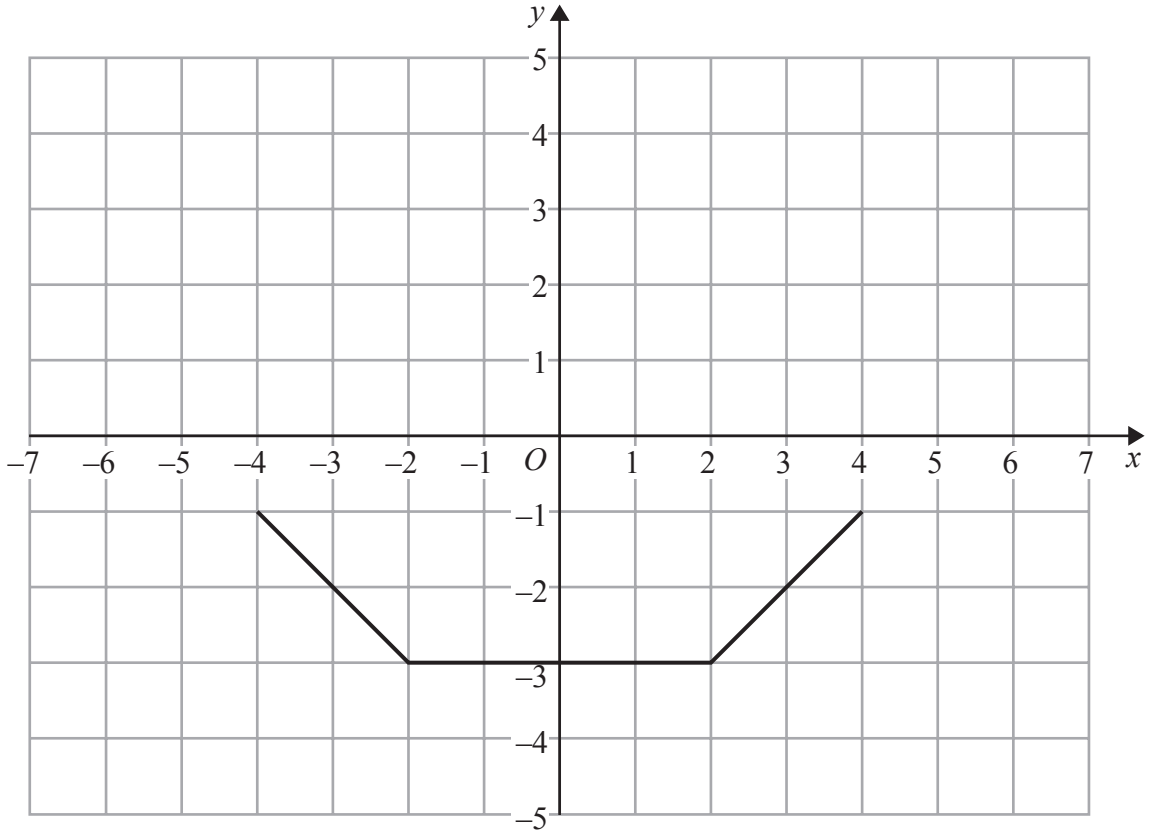


(b) On the grid above, sketch the graph of $y = \cos 2x°$ for $-180 \leqslant x \leqslant 180$

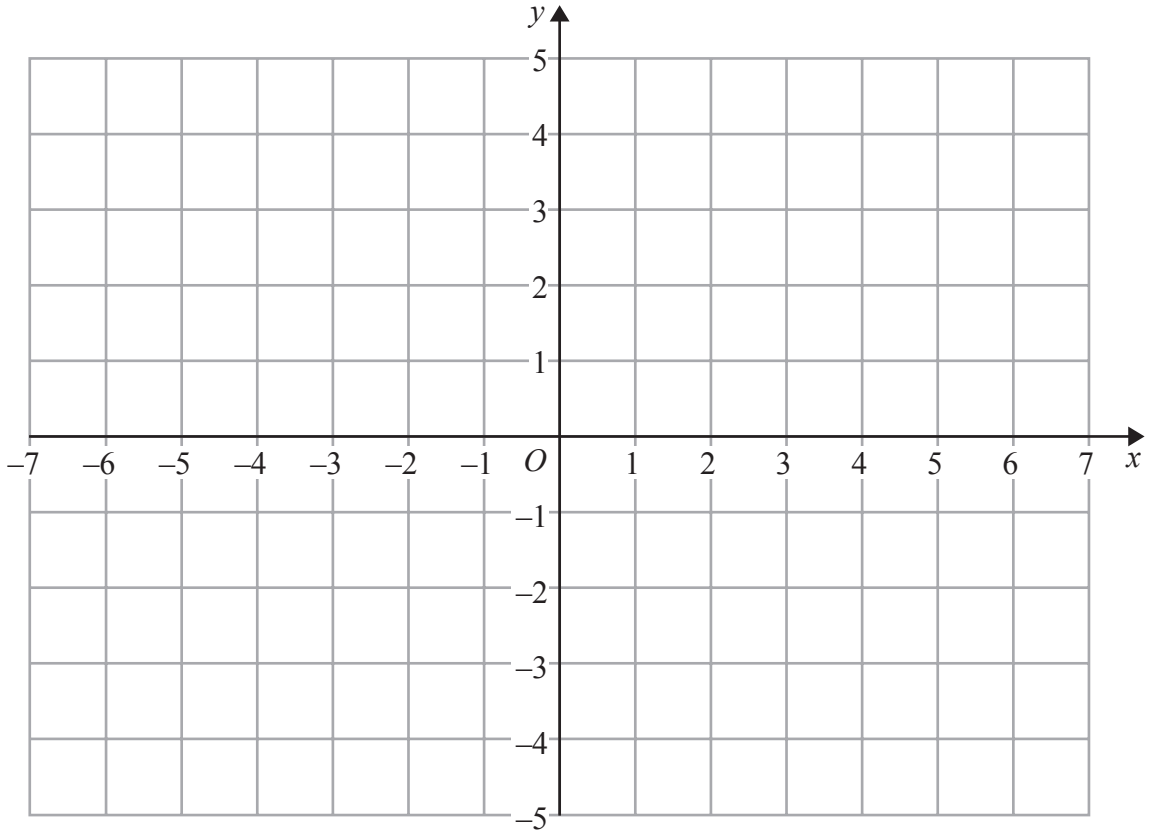
(2)

(Total for Question 16 is 4 marks)

18 Here is the graph of $y = h(x)$

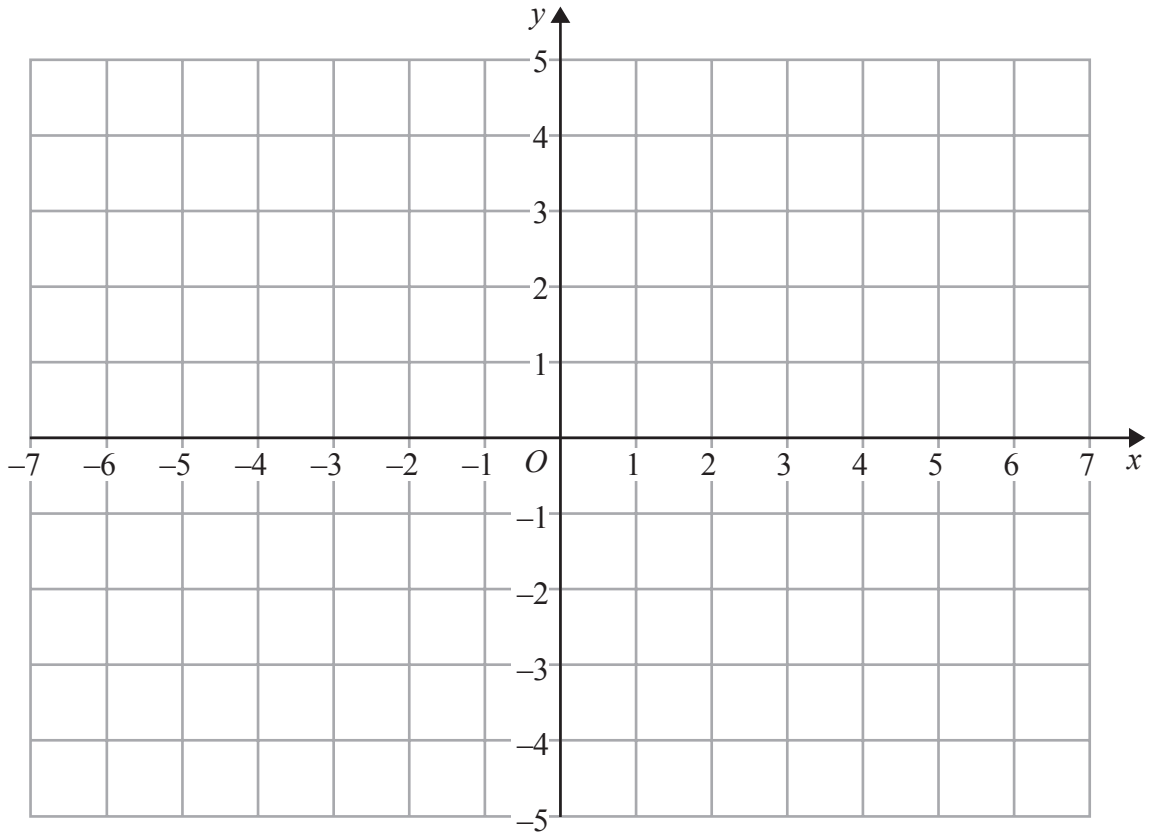


(a) On the grid below, draw the graph of $y = h(x) + 1$



(2)

(b) On the grid below, draw the graph of $y = h(2x)$



(2)

(Total for Question 18 is 4 marks)

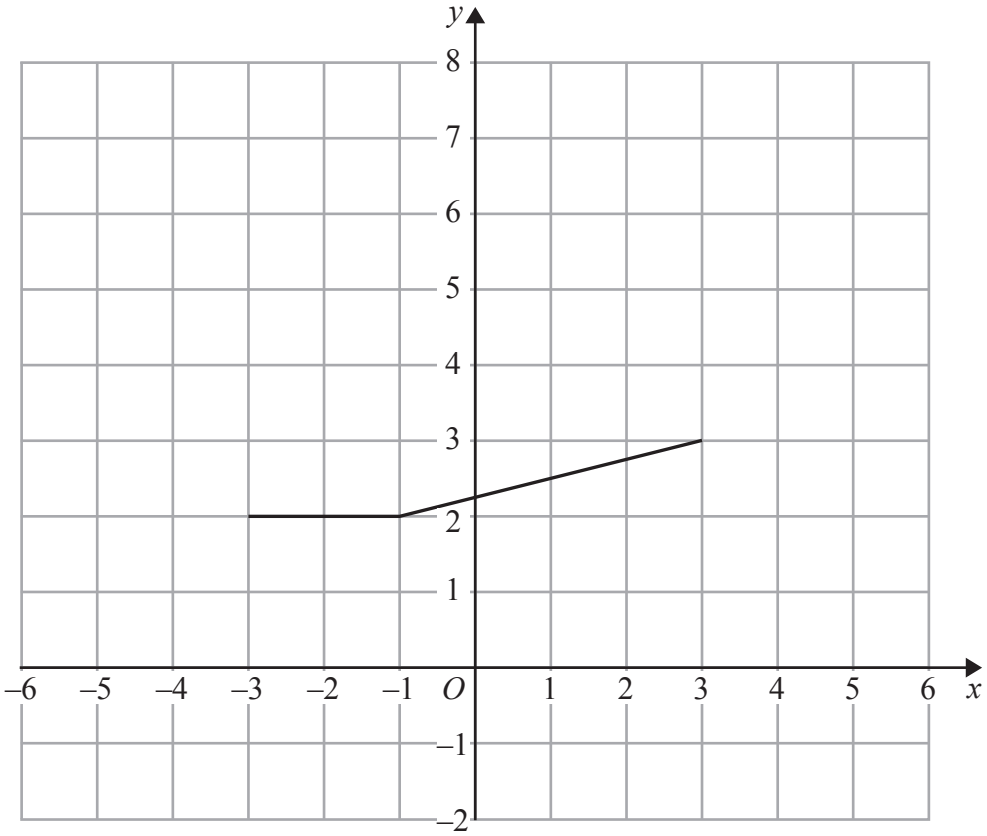
19 p is proportional to d^3

When $d = 2$, $p = 48$

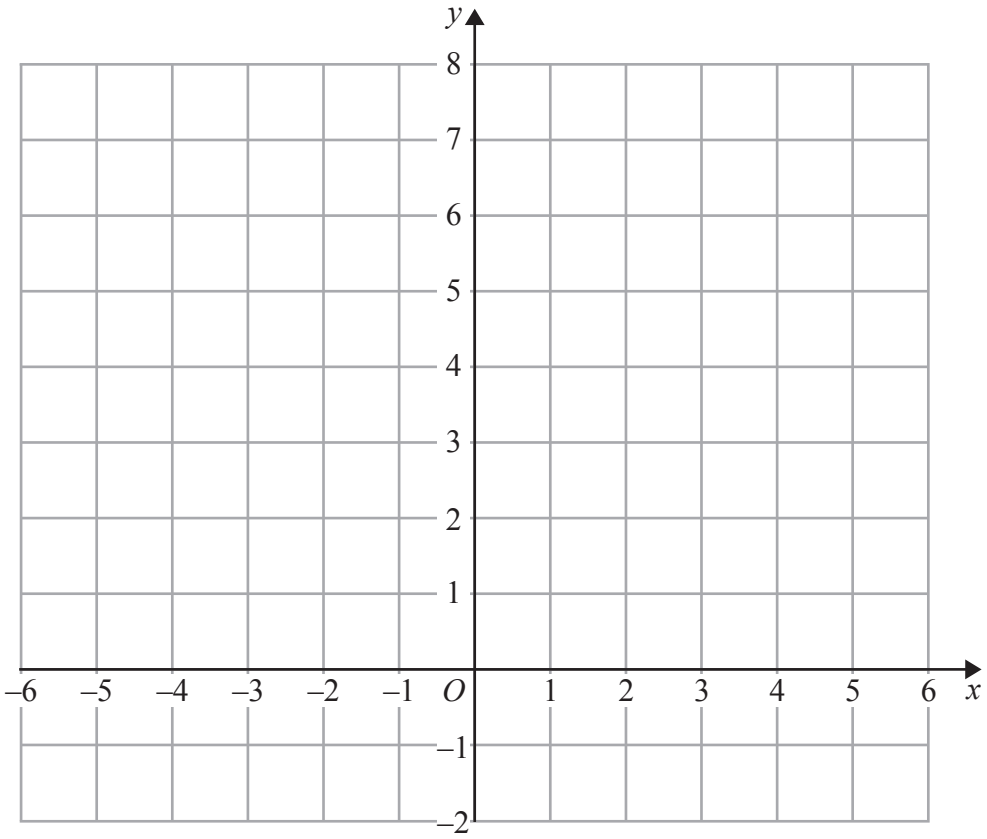
Find a formula for p in terms of d

(Total for Question 19 is 2 marks)

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

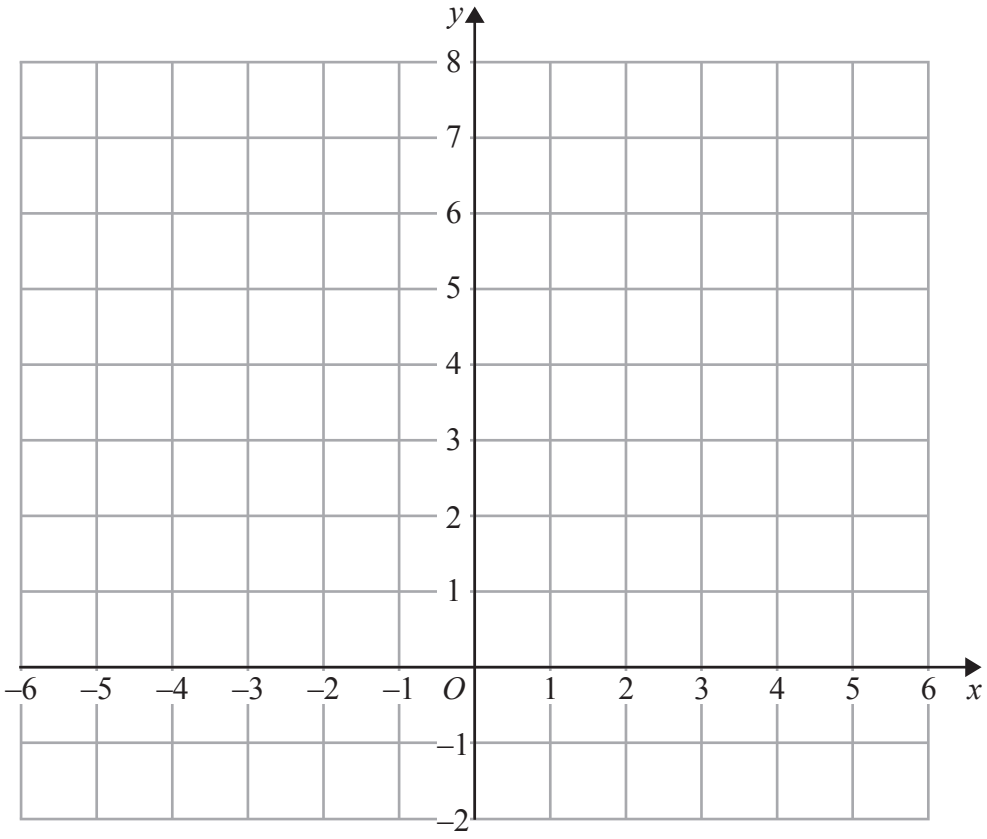


(a) On the grid below, draw the graph of $y = f(x) + 3$



(2)

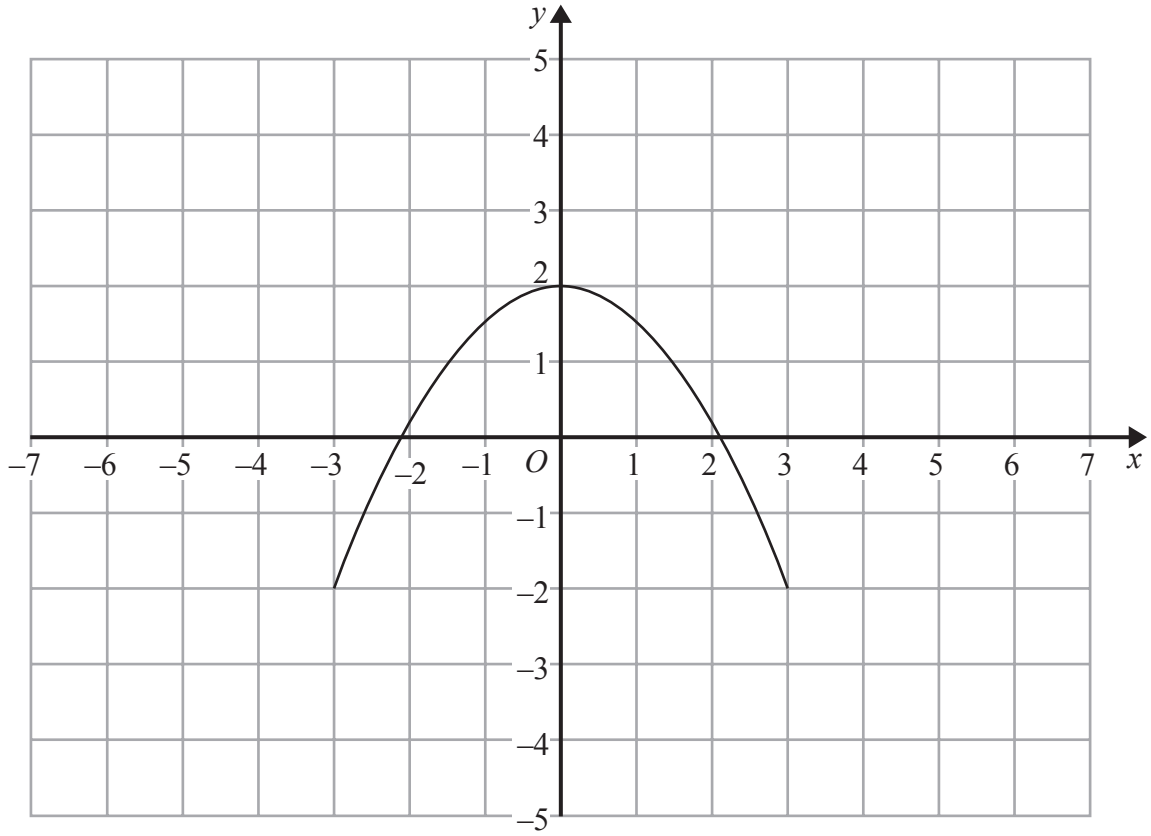
(b) On the grid below, draw the graph of $y = f(x - 2)$



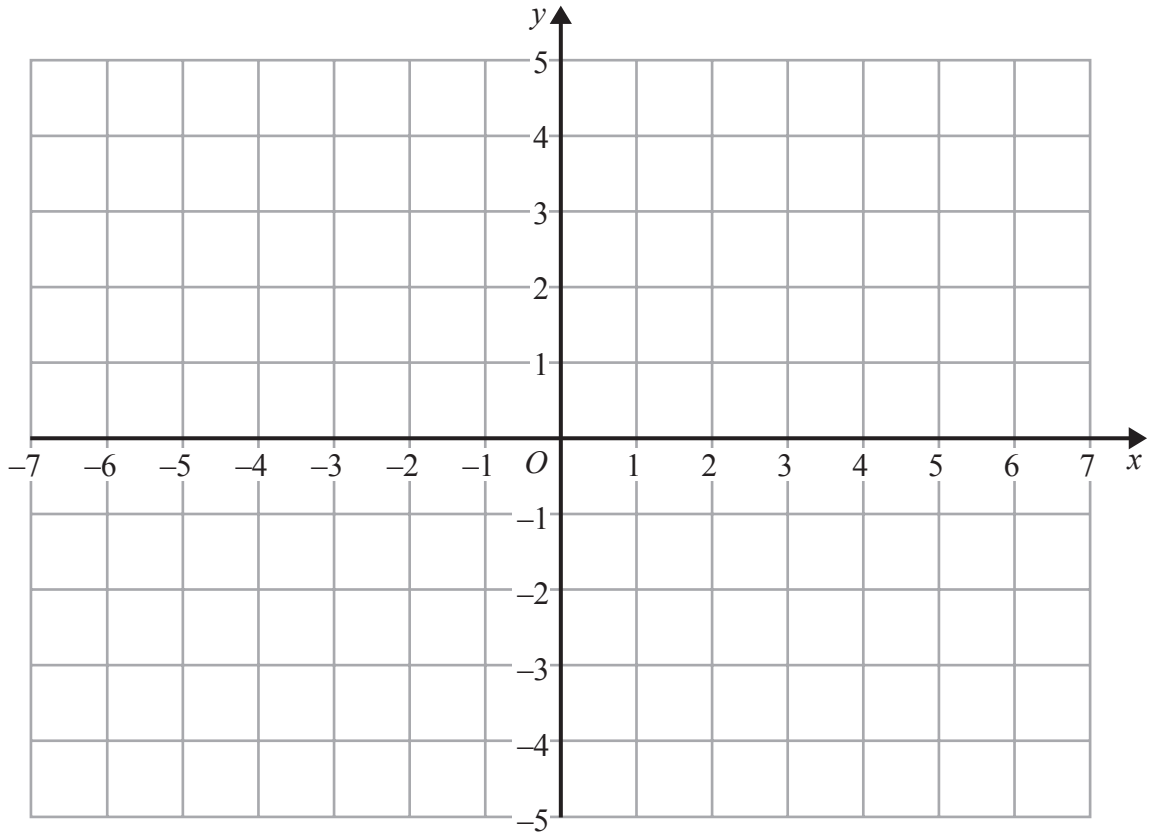
(2)

(Total for Question 14 is 4 marks)

18 Here is the graph of $y = g(x)$

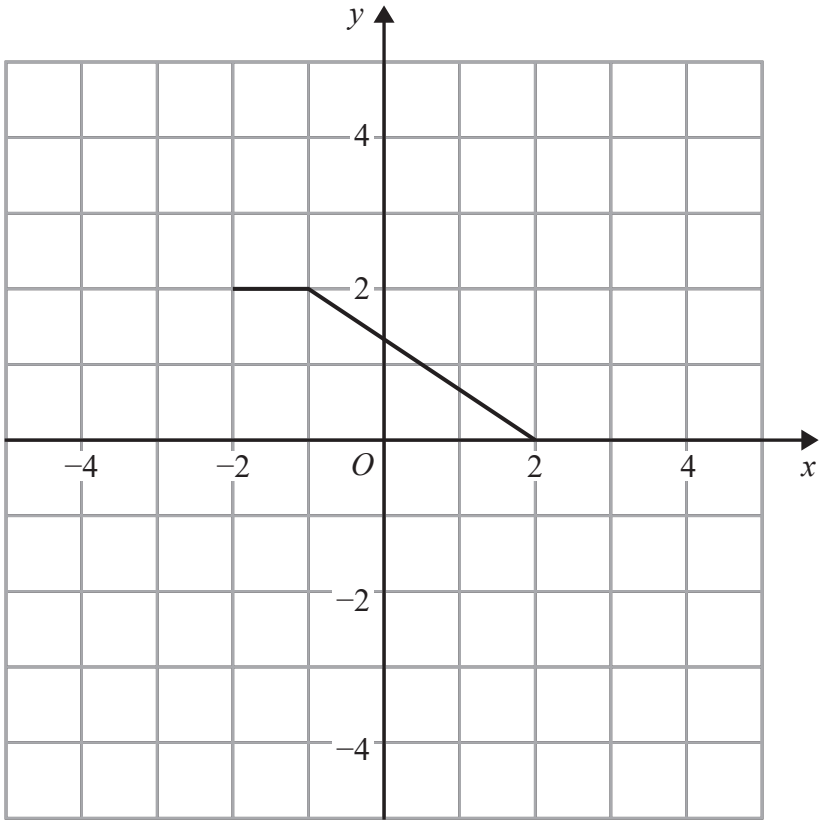


On the grid below, draw the graph of $y = \frac{1}{2}g(x)$

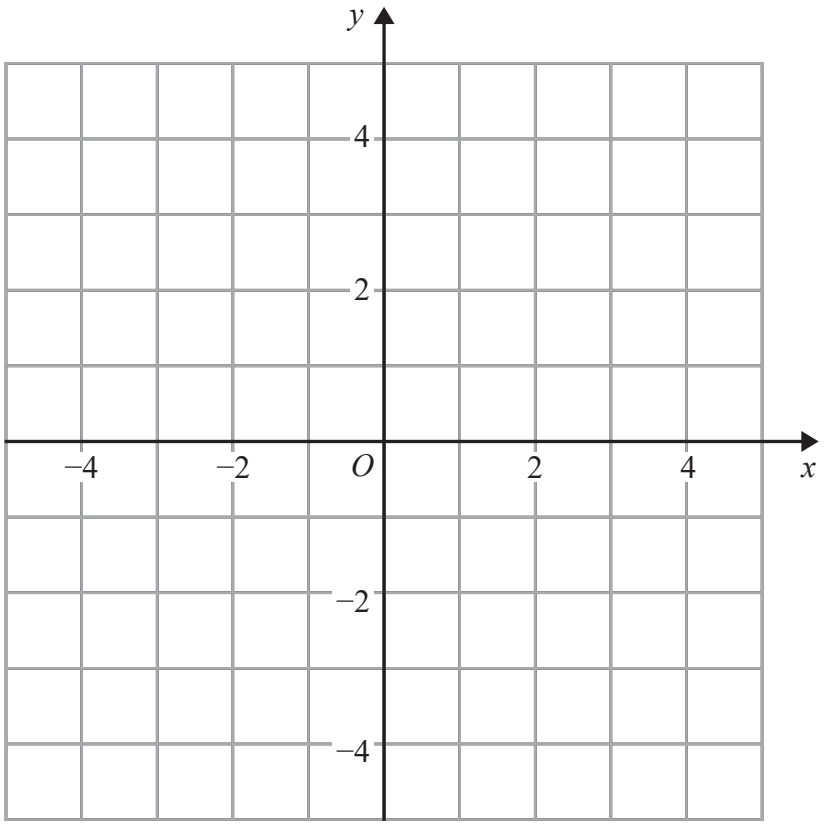


(Total for Question 18 is 2 marks)

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

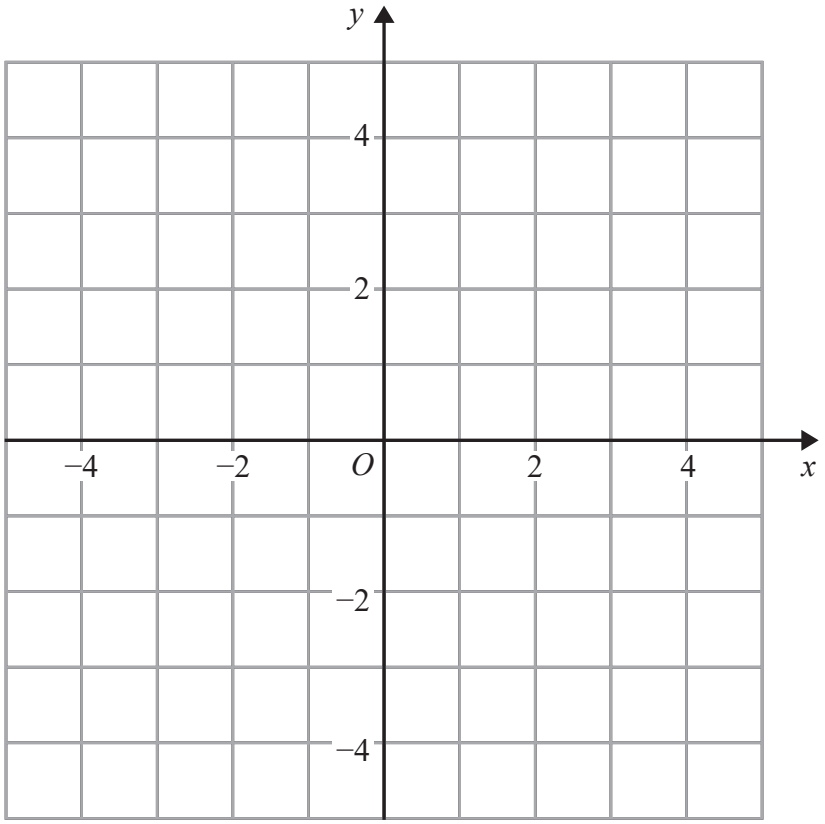


(a) On the grid below, sketch the graph of $y = f(x) - 3$



(2)

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

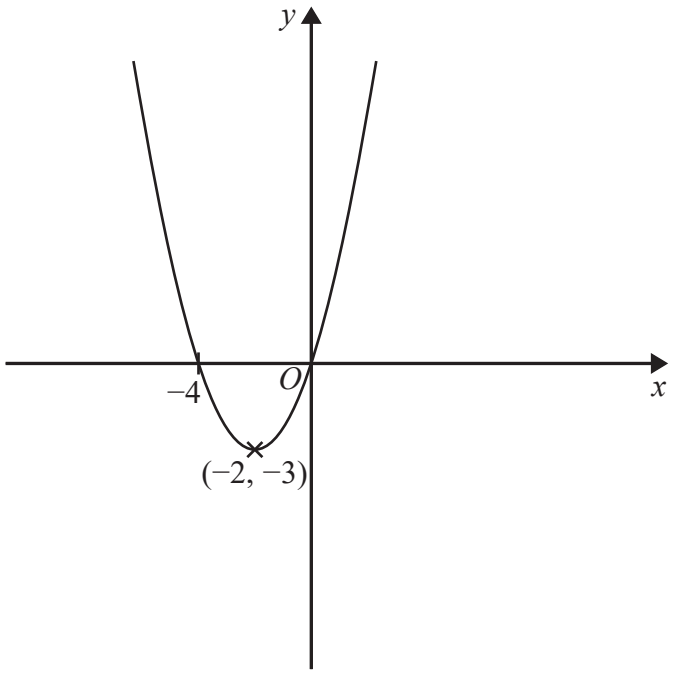


(2)

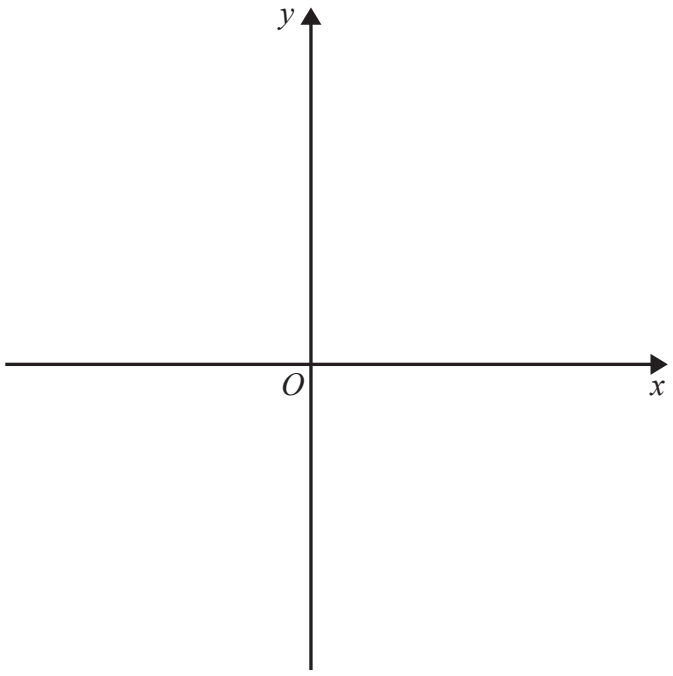
(Total for Question 20 is 4 marks)

TOTAL FOR PAPER IS 90 MARKS

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



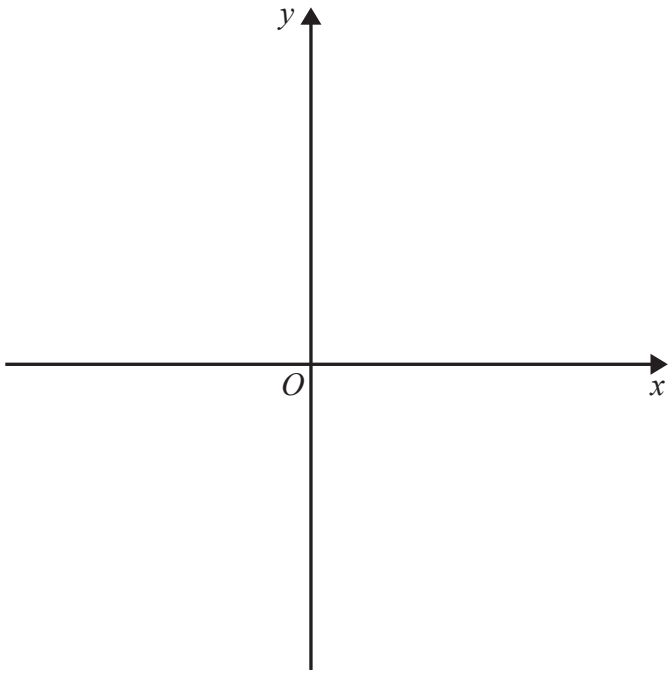
(a) On the axes below, sketch the graph of $y = -f(x)$
On your sketch, show the coordinates of any points where the graph intersects the x-axis and show the coordinates of any turning points.



(2)

(b) On the axes below, sketch the graph of $y = \frac{1}{2}\,f(x)$

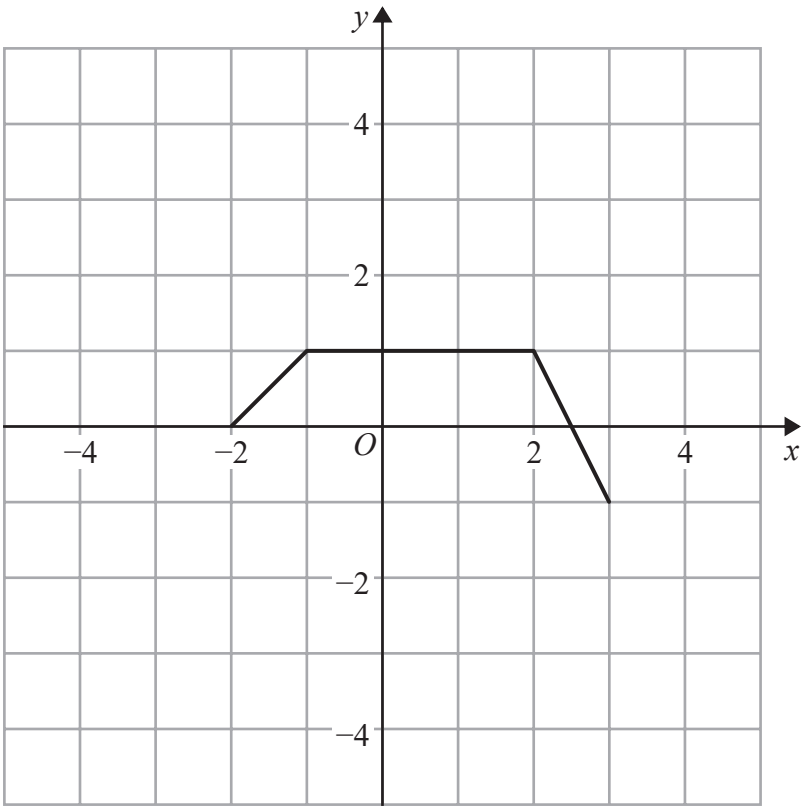
On your sketch, show the coordinates of any points where the graph intersects the x-axis and show the coordinates of any turning points.



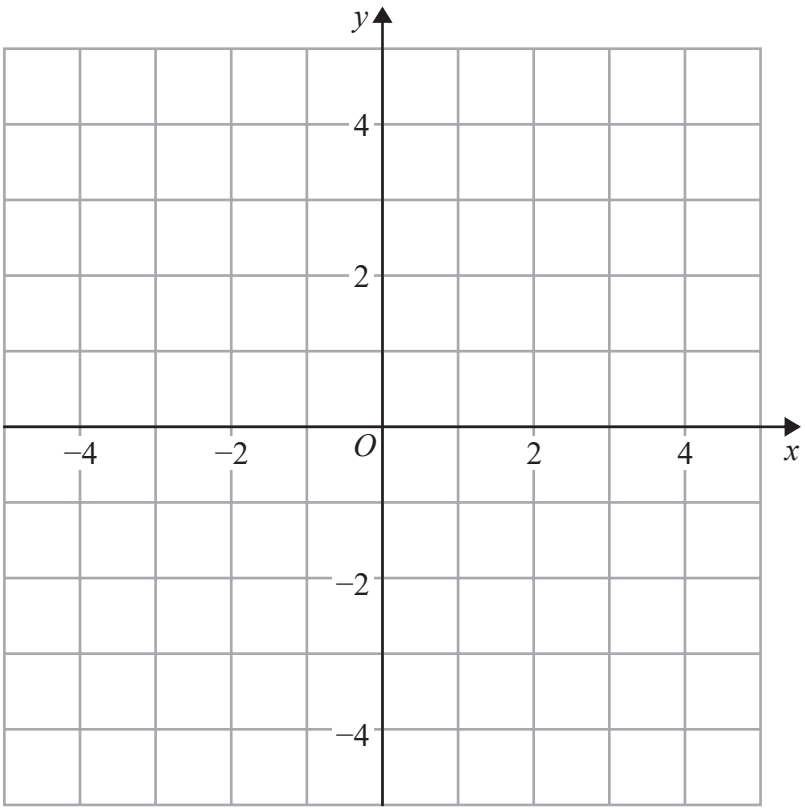
(2)

(Total for Question 18 is 4 marks)

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



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



(2)

A different graph has equation $y = g(x)$

Point A has coordinates (2, 5) and lies on the graph of $y = g(x)$

Point A is transformed to point B on the graph of $y = g(x + 6)$

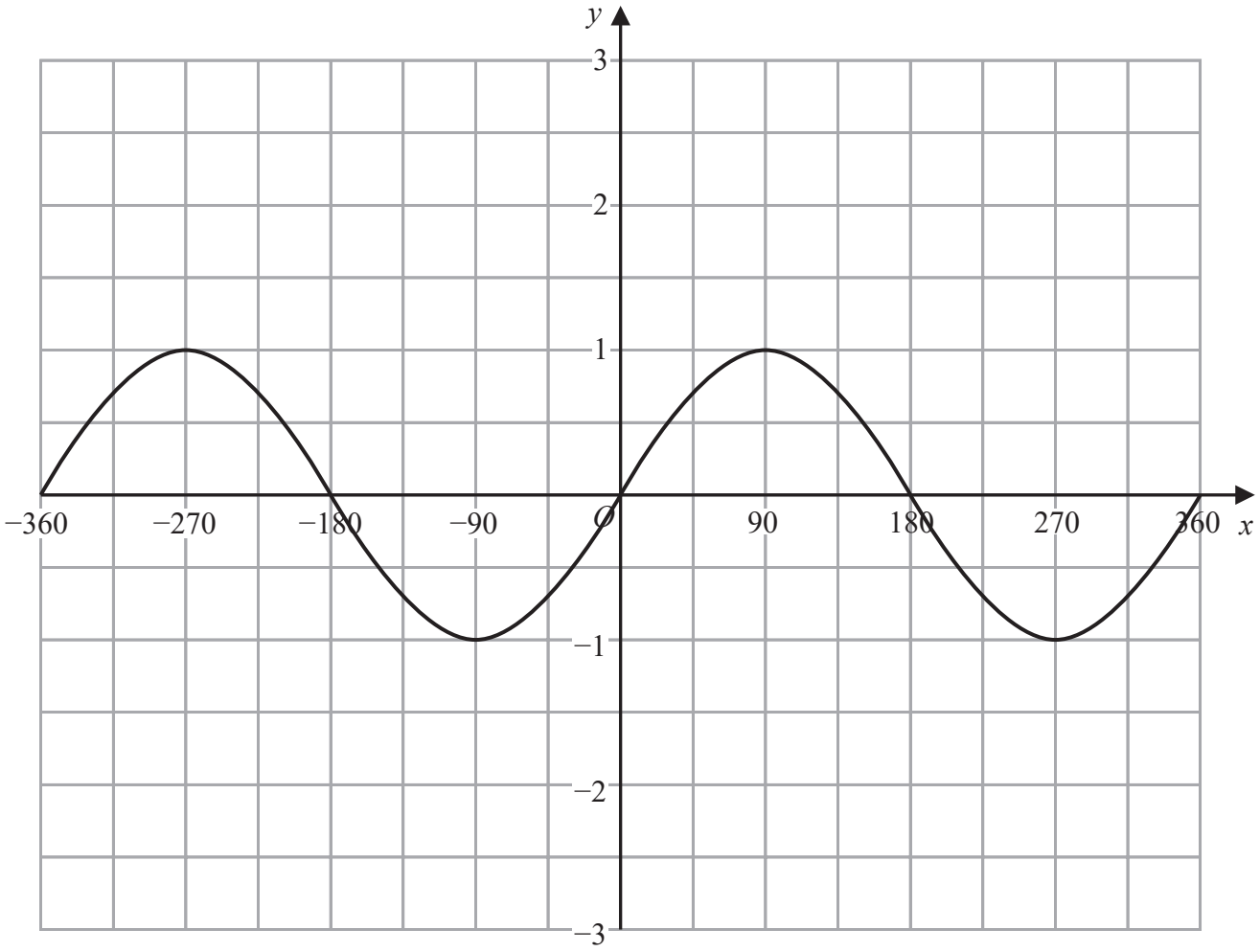
(b) Write down the coordinates of point B.

.....

(2)

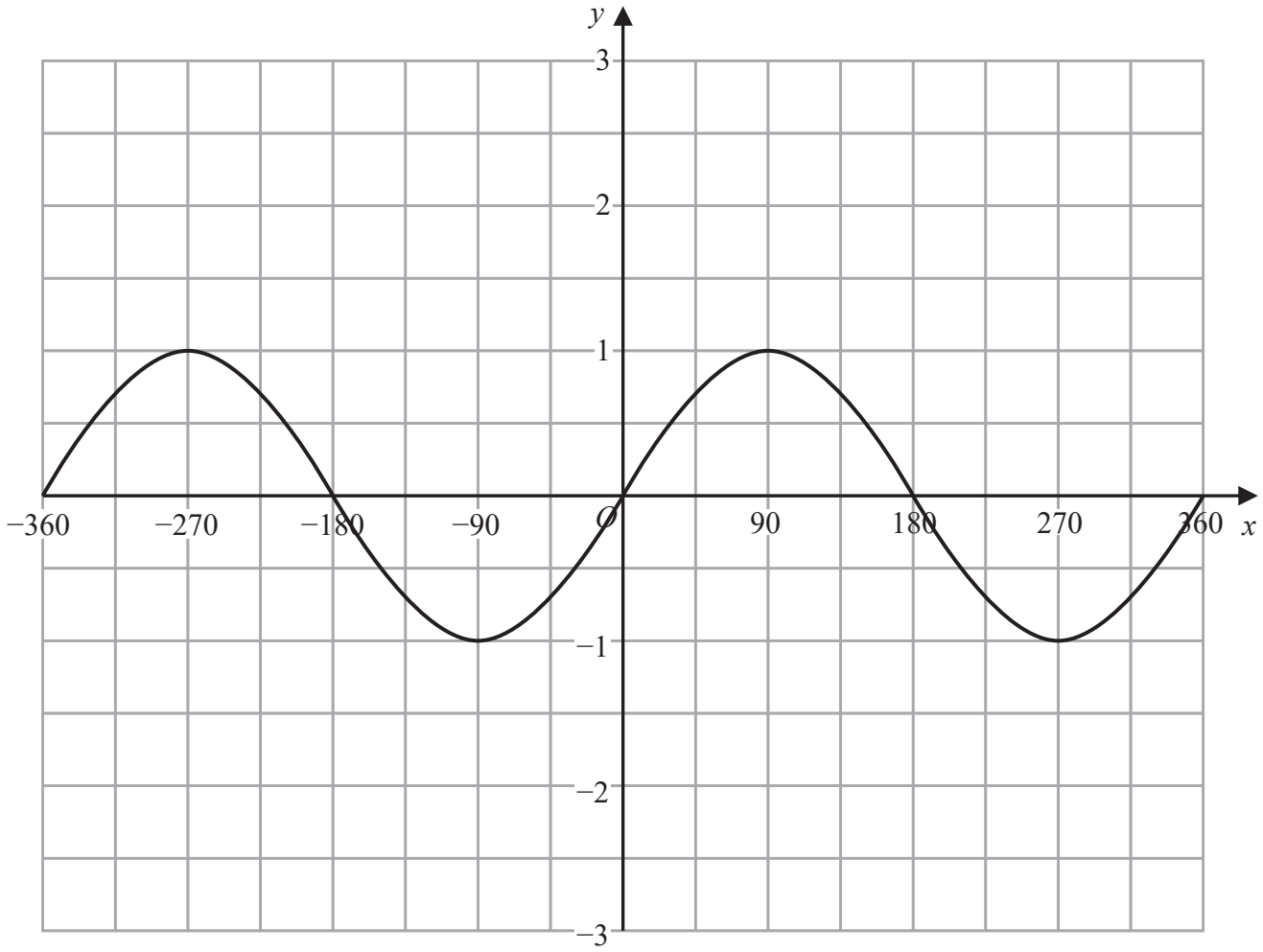
(Total for Question 18 is 4 marks)

15 Here is the graph of $y = \sin x°$ for $-360 \leqslant x \leqslant 360$



(a) On the grid above, sketch the graph of $y = \sin(x + 45)°$ for $-360 \leqslant x \leqslant 360$

(2)

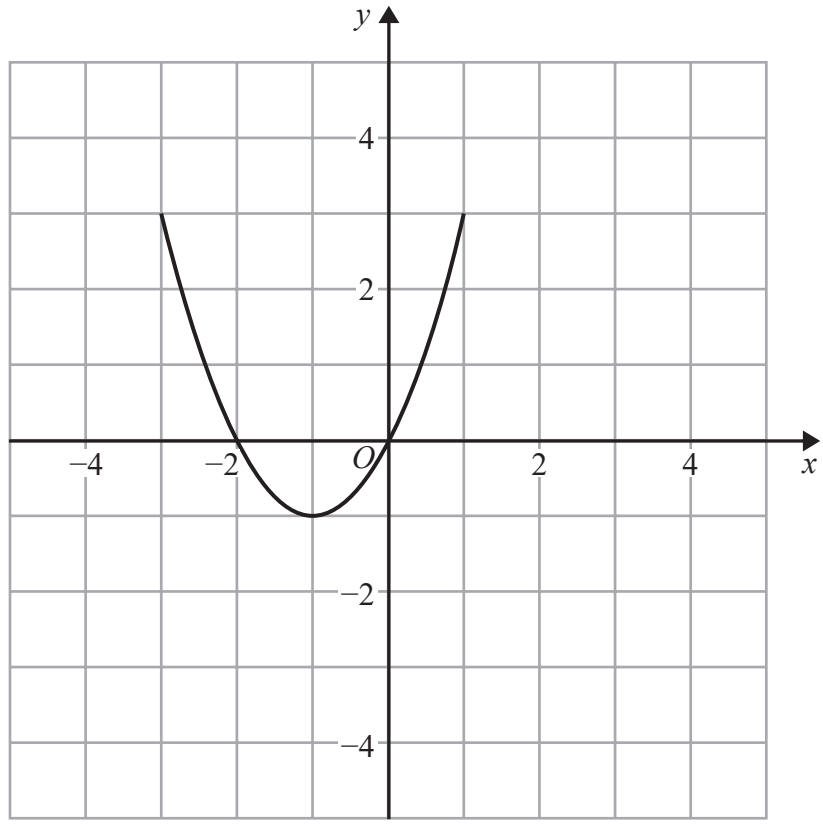


(b) On the grid above, sketch the graph of $y = -2 + \sin x°$ for $-360 \leqslant x \leqslant 360$

(2)

(Total for Question 15 is 4 marks)

20 Here is the graph of $y = g(x)$



(a) (i) On the grid above, draw the graph of $y = -g(x)$

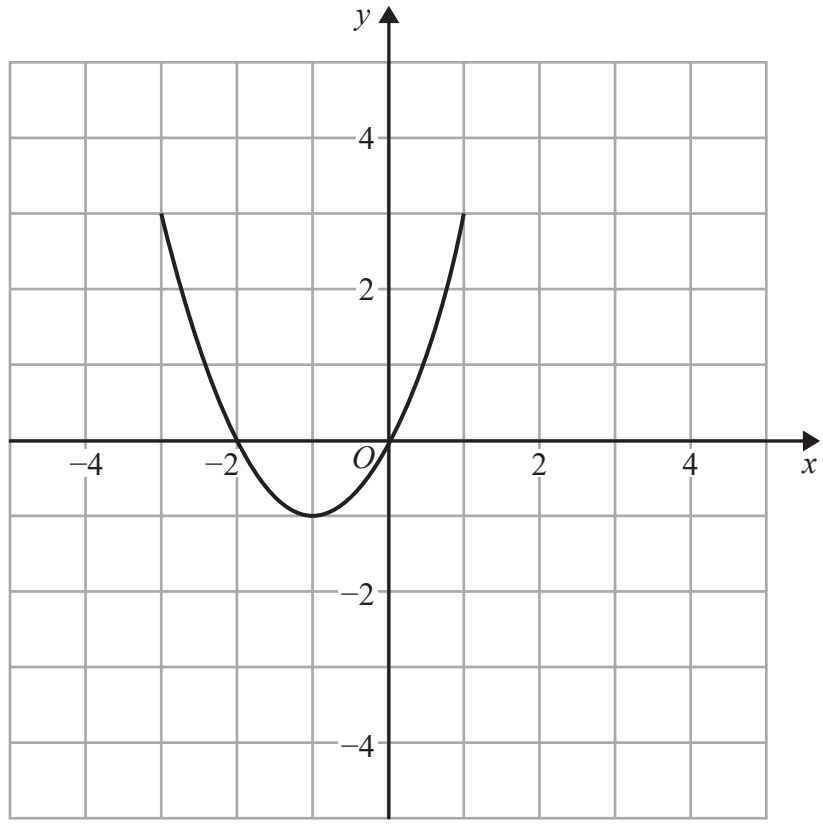
(2)

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

.....

(1)

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

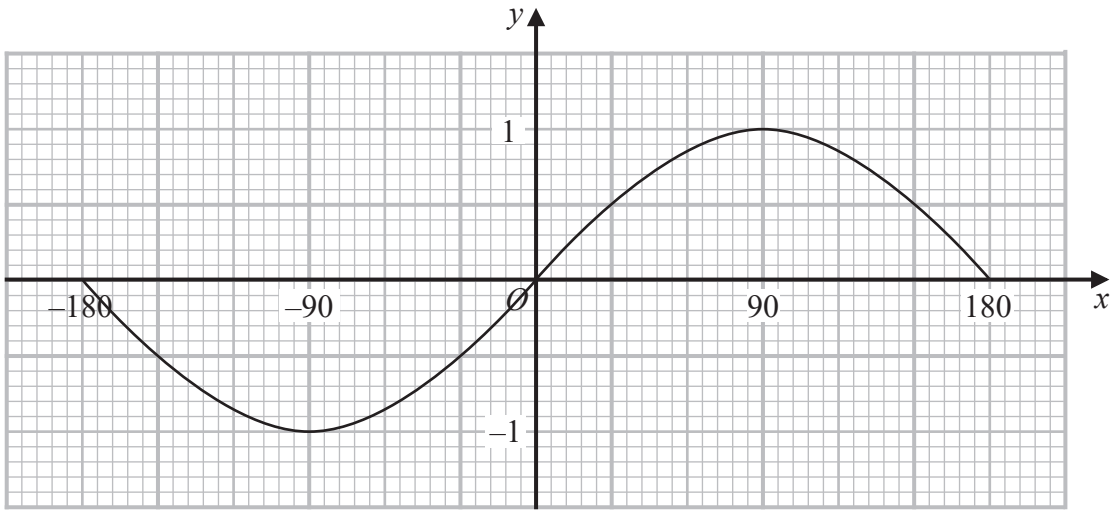


(b) On the grid above, draw the graph of $y = g(x + 1)$

(2)

(Total for Question 20 is 5 marks)

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



(a) Use the graph above to find an estimate for each of the solutions of the equation

$$5 \sin x° = 2 \quad \text{for } -180 \leqslant x \leqslant 180$$

.....

(2)

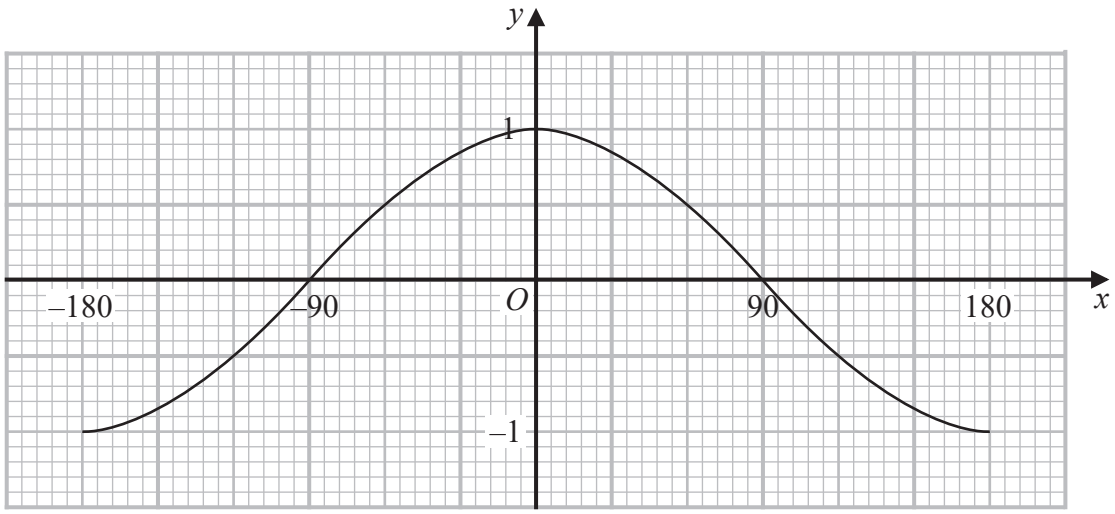
(b) Use the graph above to find an estimate for each of the solutions of the equation

$$\sin (x + 20)° = 0.7 \quad \text{for } -180 \leqslant x \leqslant 180$$

.....

(2)

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

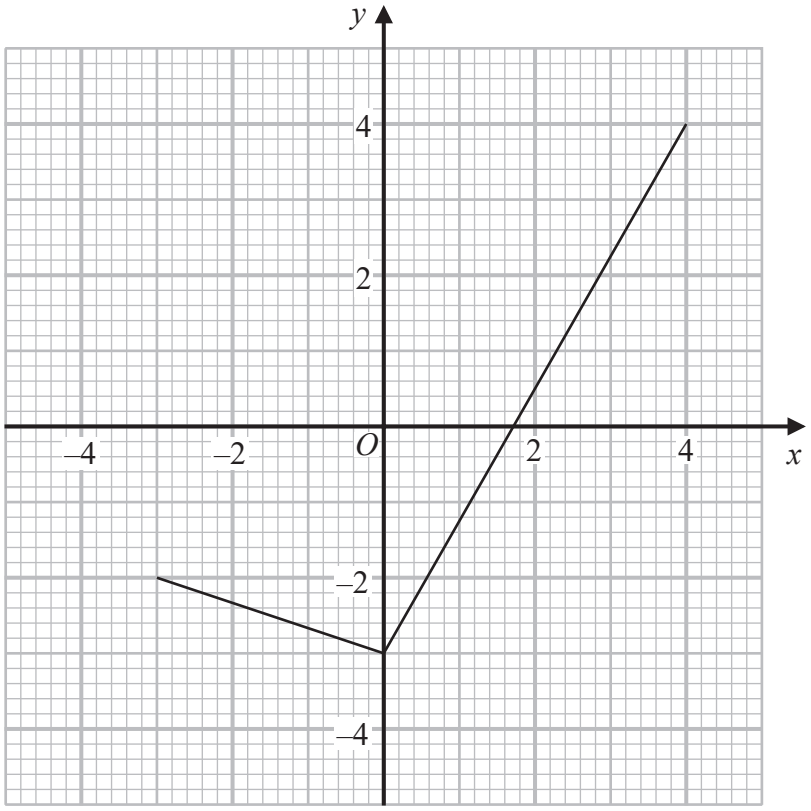


(c) On the grid above, sketch the graph of $y = \cos \frac{1}{2}x°$ for $-180 \leqslant x \leqslant 180$

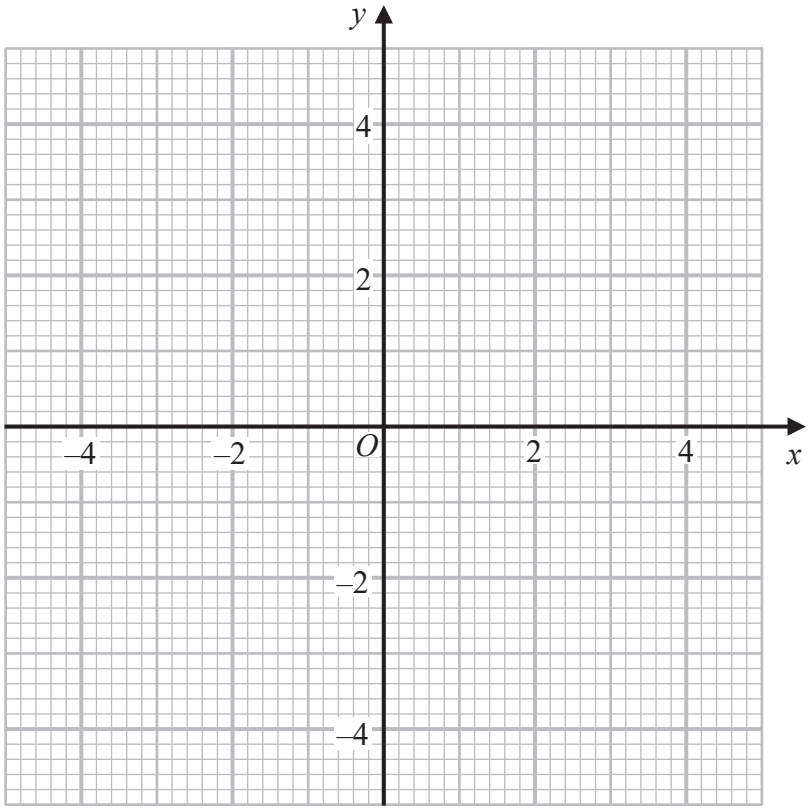
(2)

(Total for Question 16 is 6 marks)

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

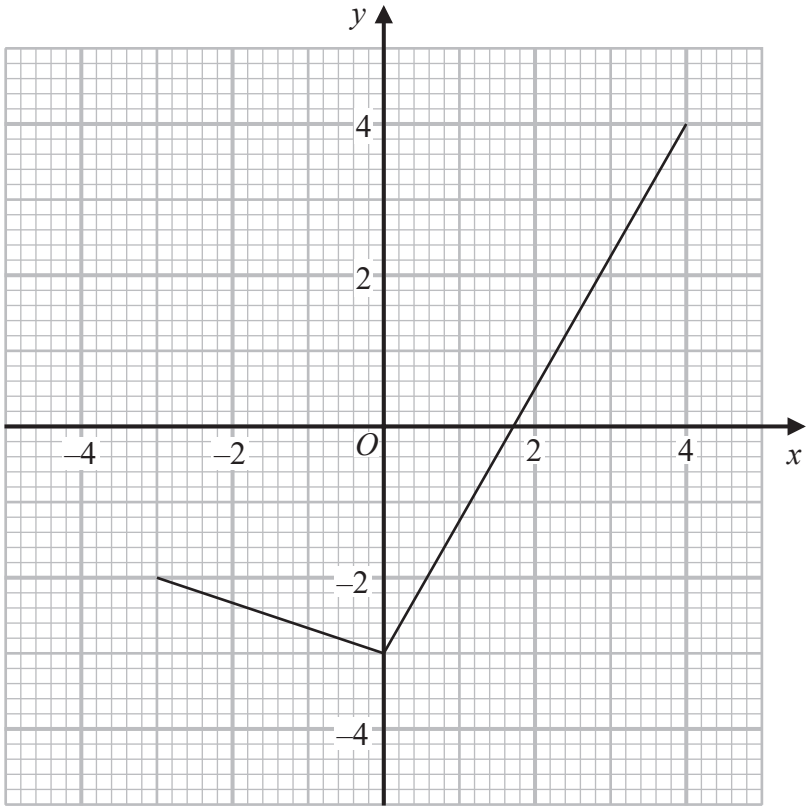


(a) On the grid below, draw the graph of $y = -f(x)$

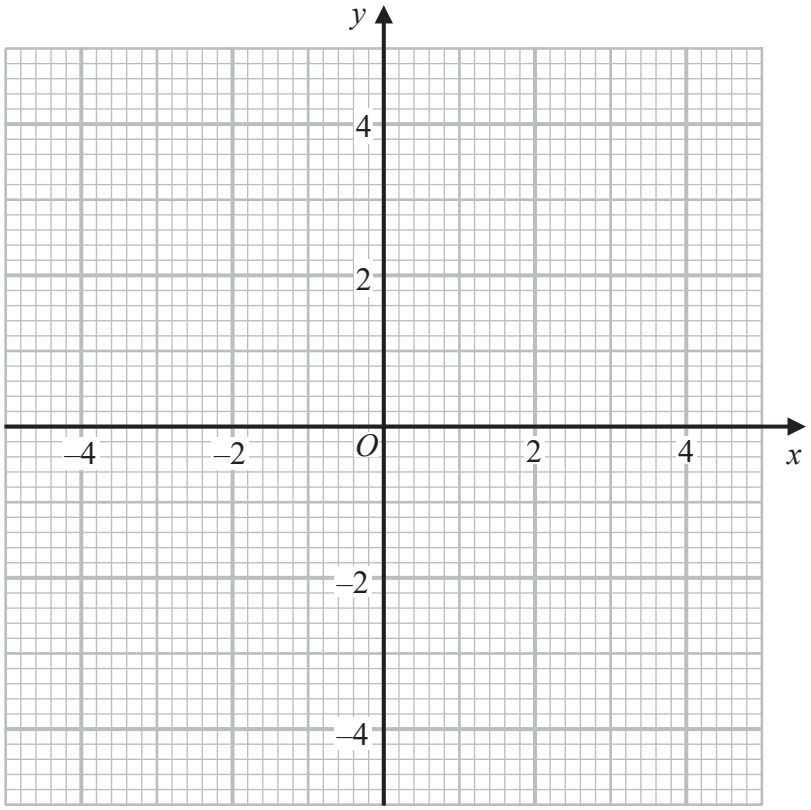


(2)

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



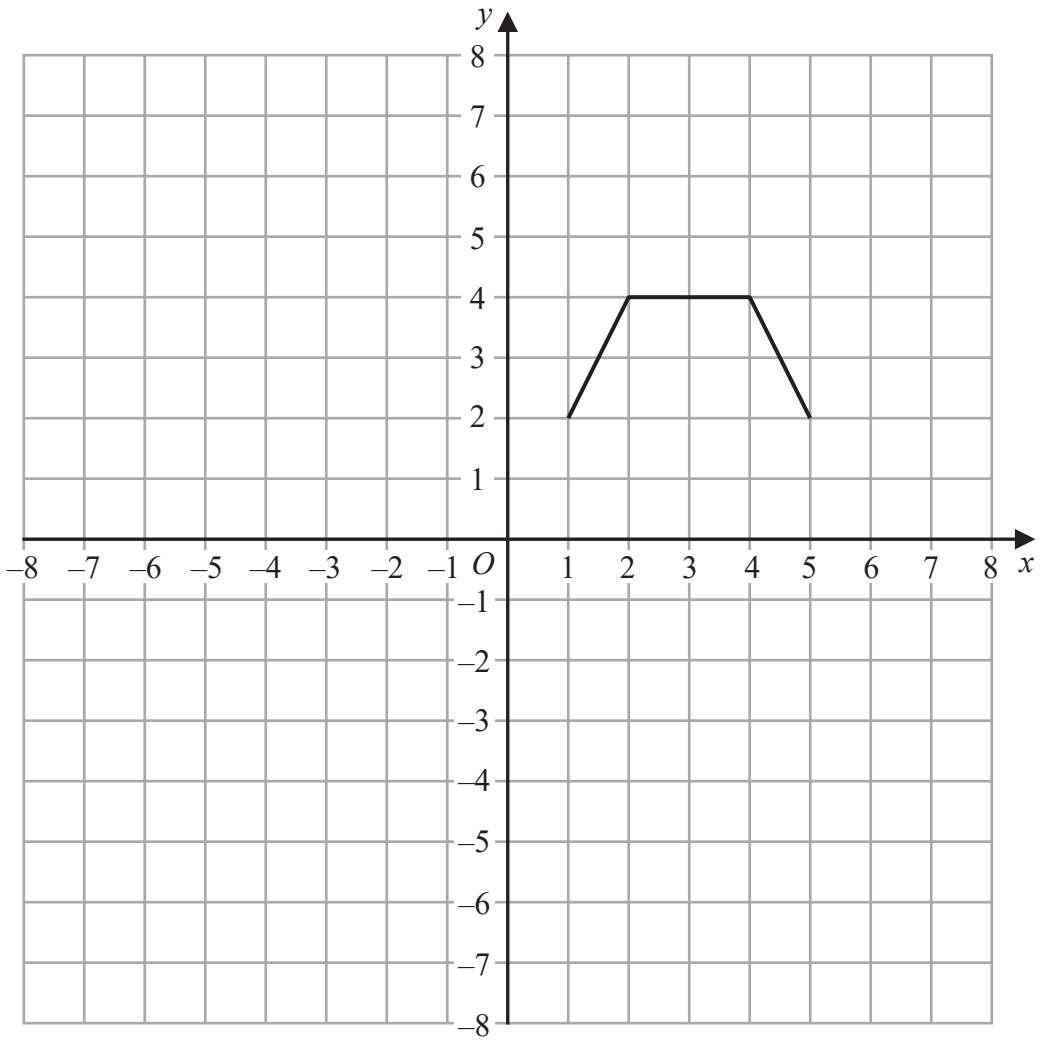
(b) On the grid below, draw the graph of $y = f(x + 2)$



(2)

(Total for Question 18 is 4 marks)

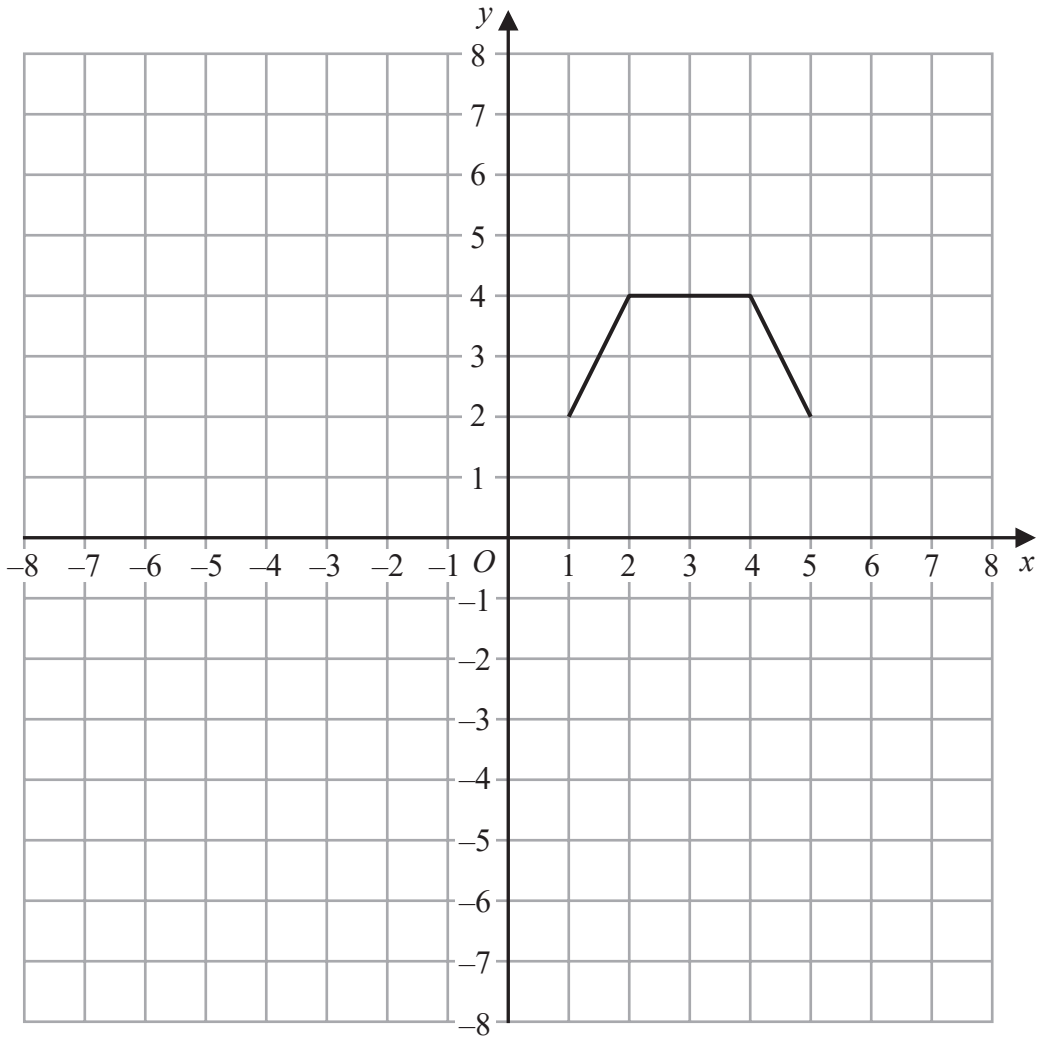
18 Here is the graph of $y = h(x)$



(a) On the grid above, draw the graph of $y = \frac{1}{2}h(x)$

(2)

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

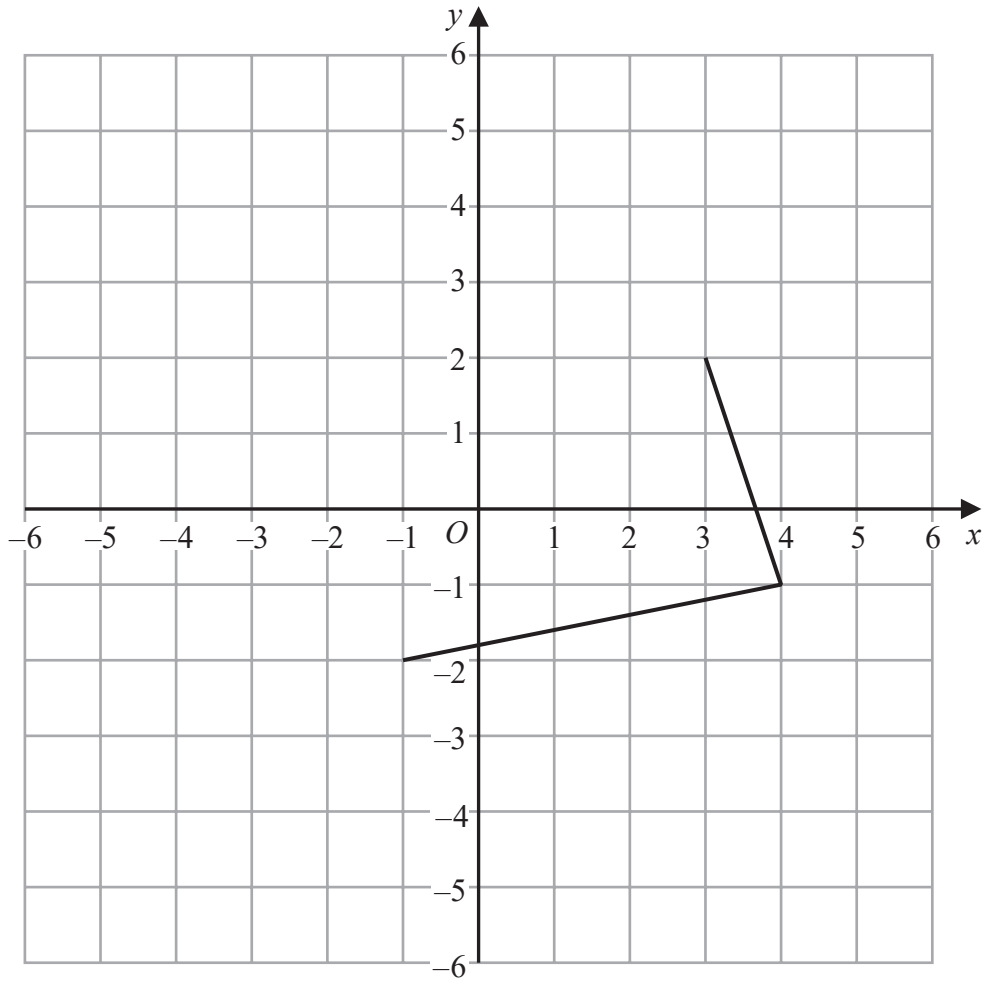


(b) On the grid above, draw the graph of $y = h(x + 2)$

(2)

(Total for Question 18 is 4 marks)

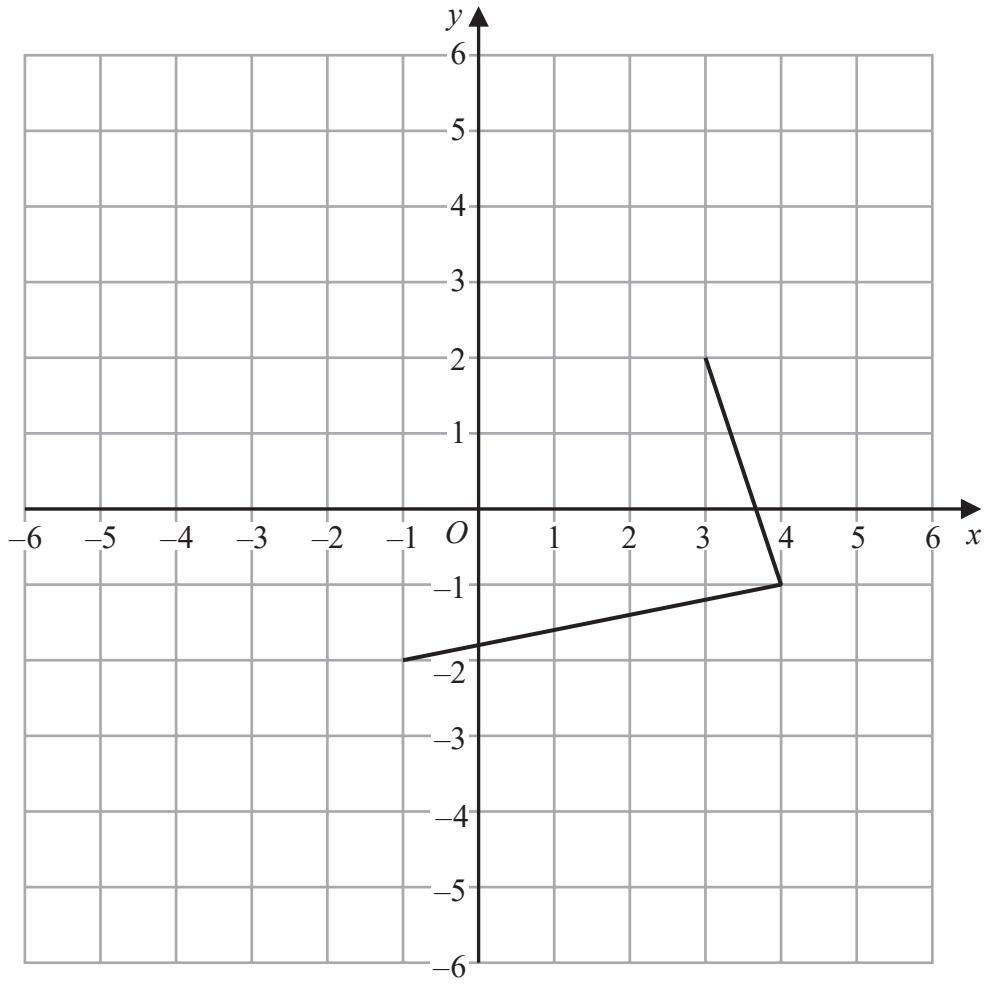
20 Here is the graph of $y = f(x)$



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

(2)

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

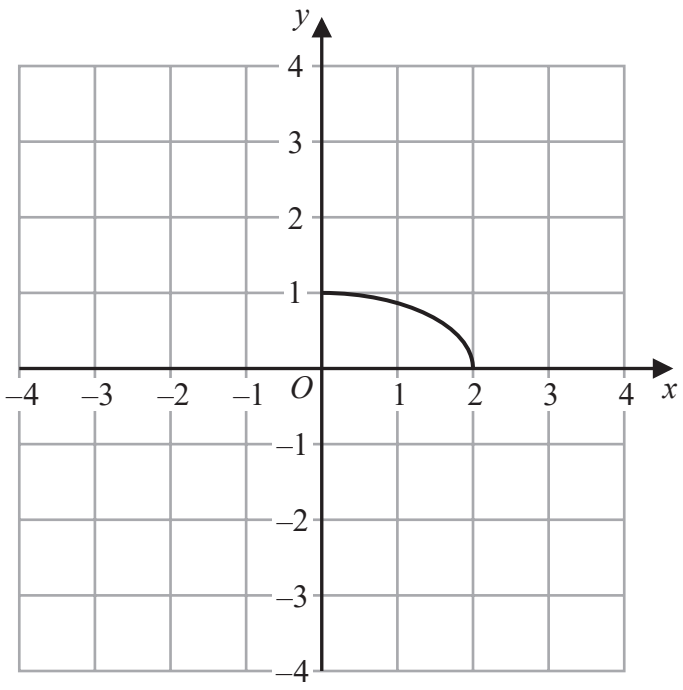


(b) On the grid above, draw the graph of $y = f(2x)$

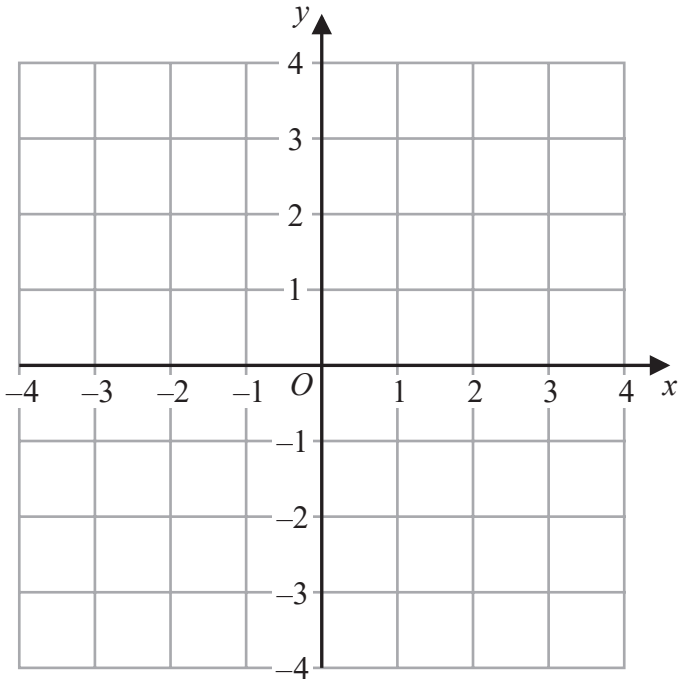
(2)

(Total for Question 20 is 4 marks)

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

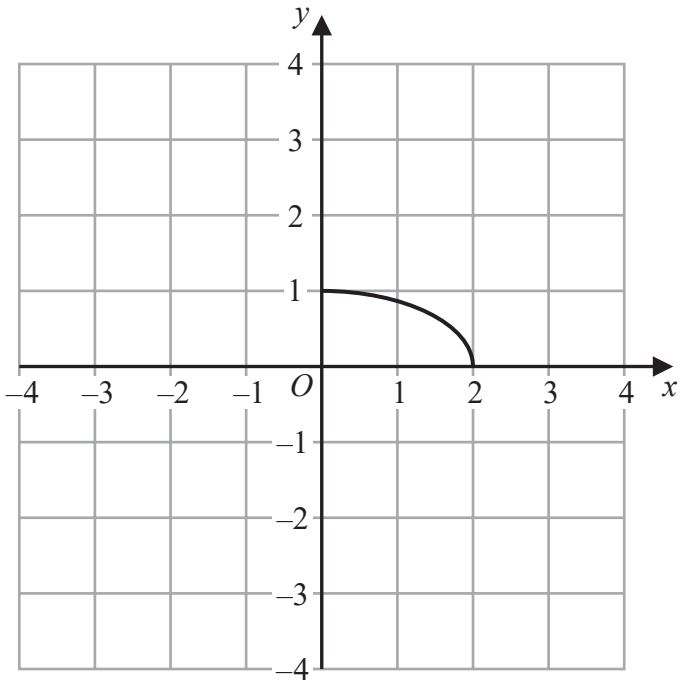


(a) On the grid below, draw the graph of $y = -2f(x)$

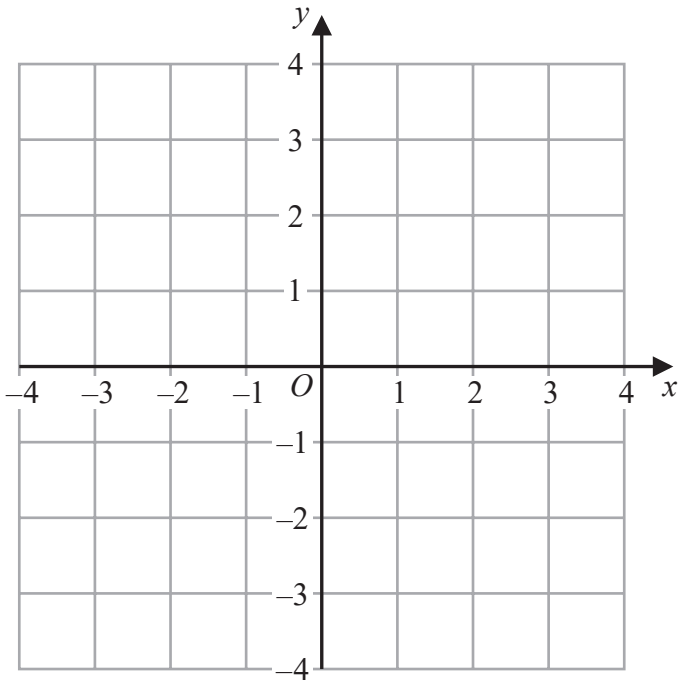


(2)

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



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

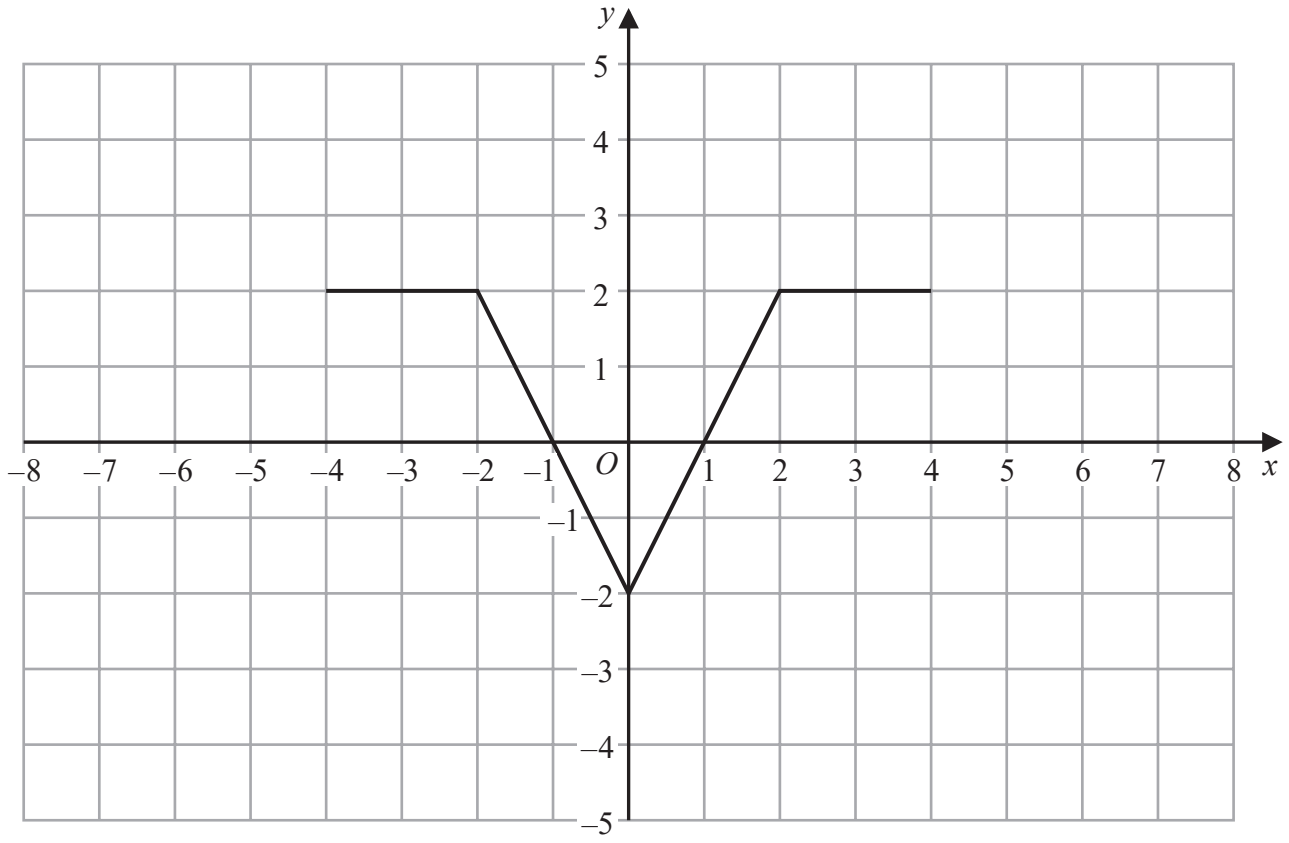


(2)

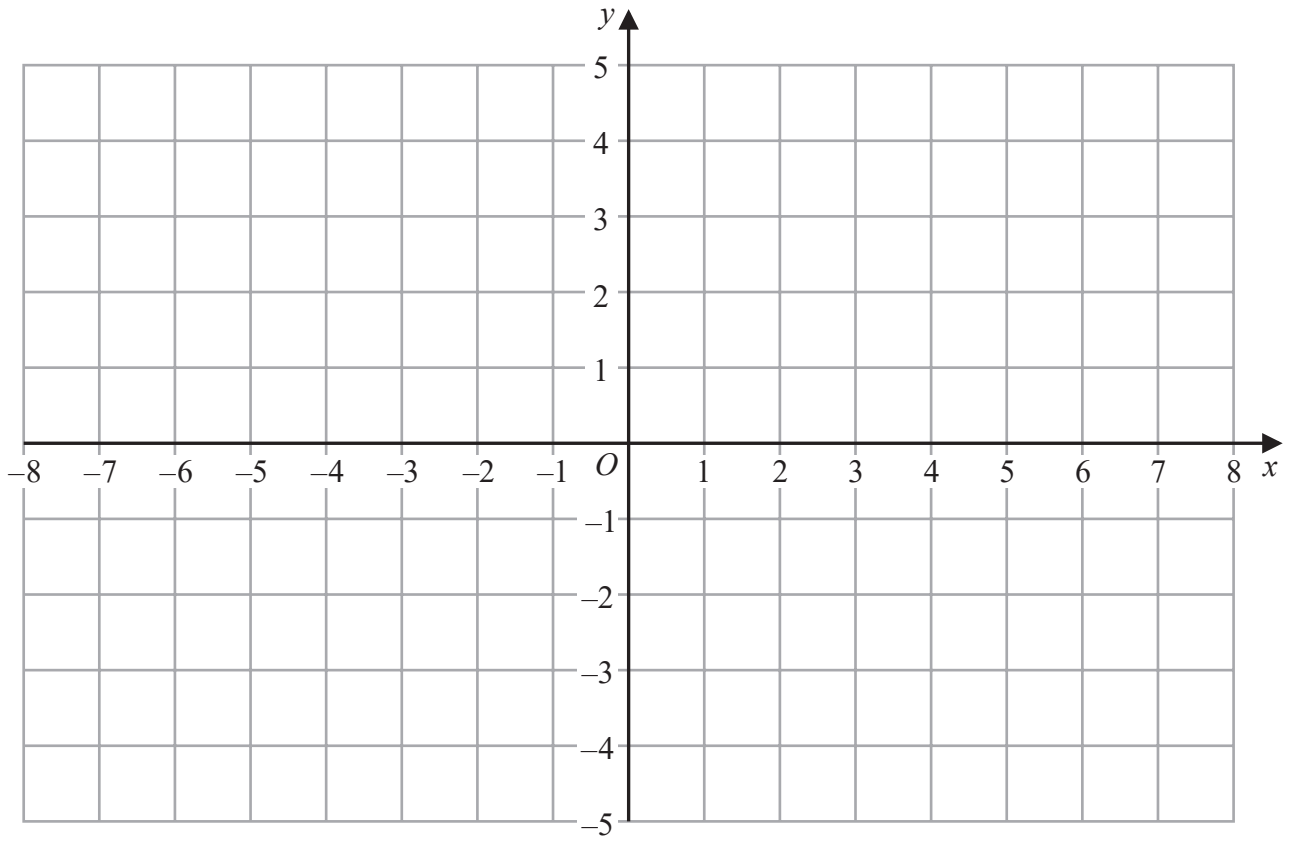
(Total for Question 17 is 4 marks)

TOTAL FOR PAPER IS 90 MARKS

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



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



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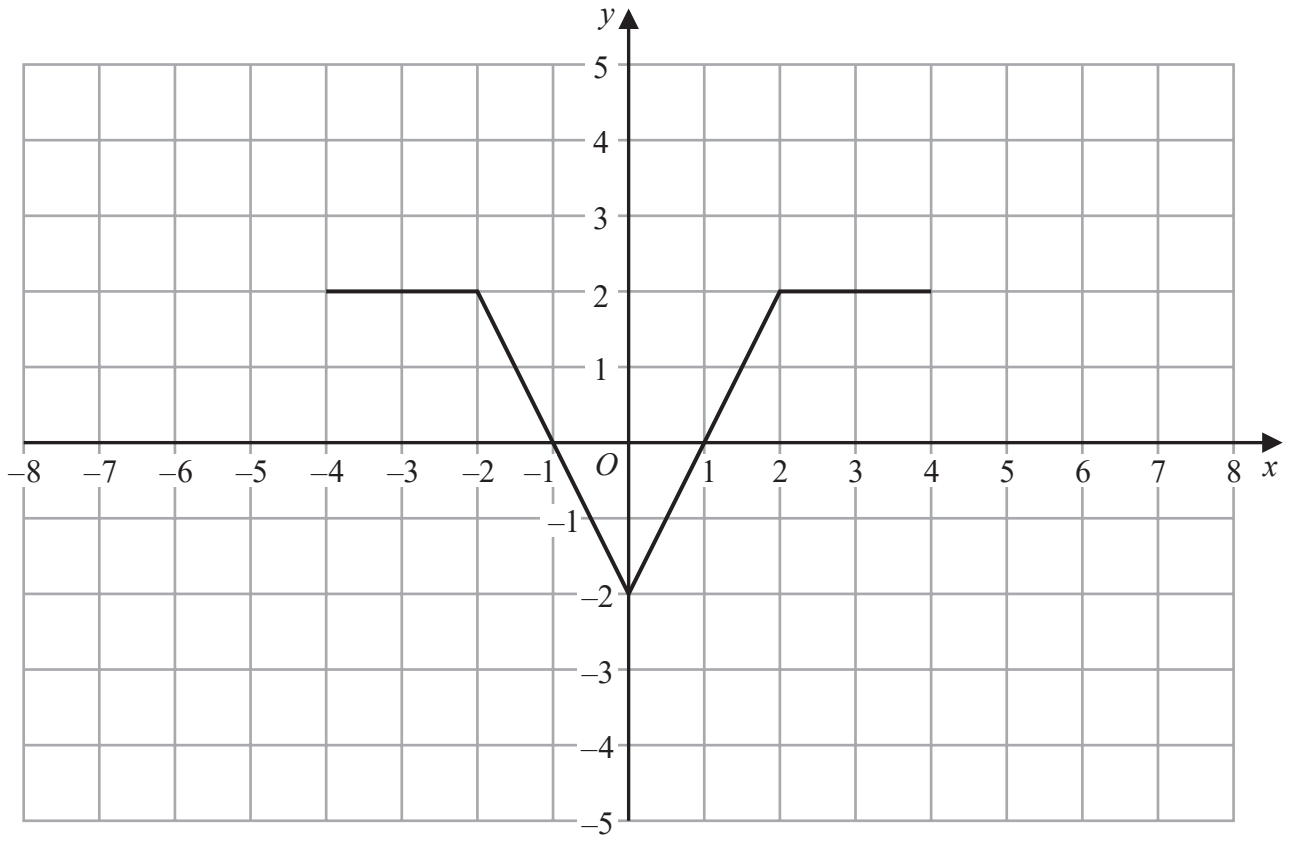
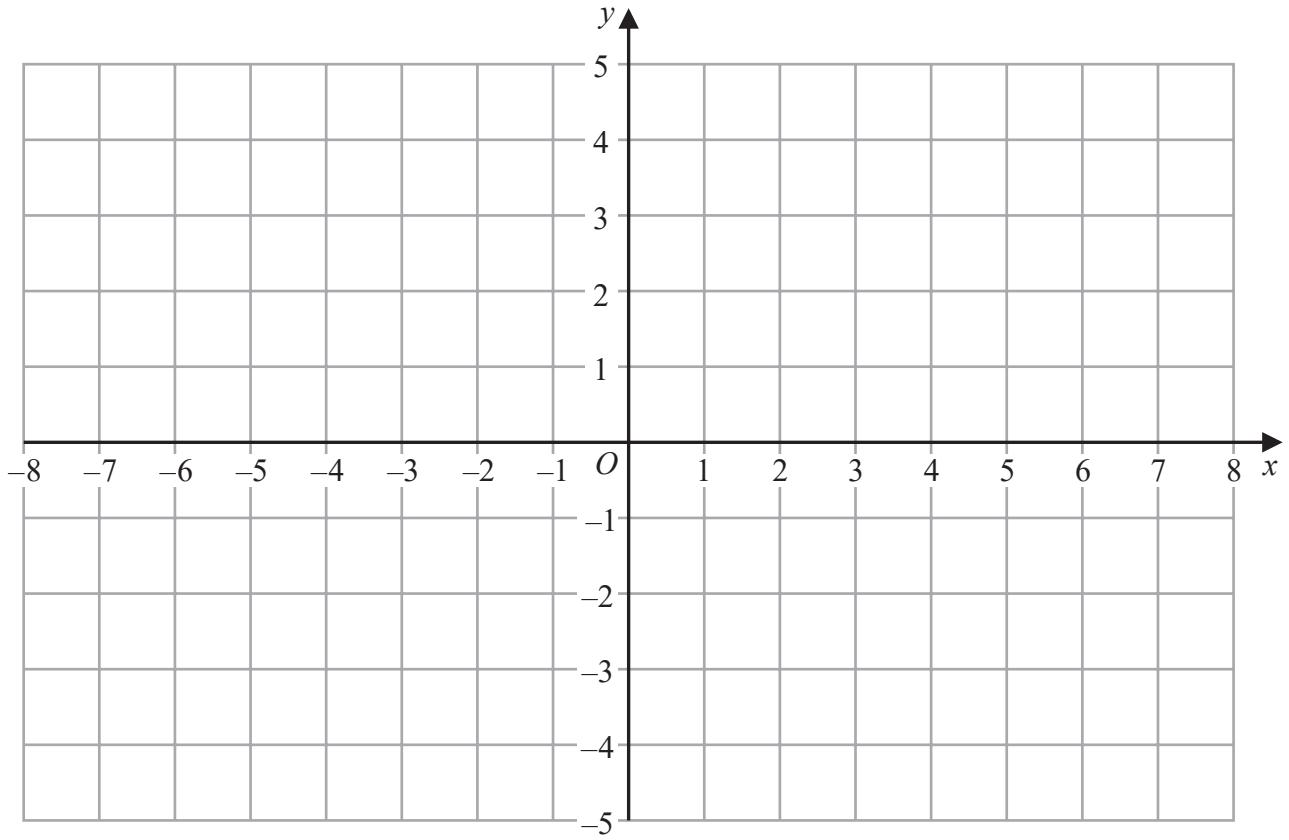


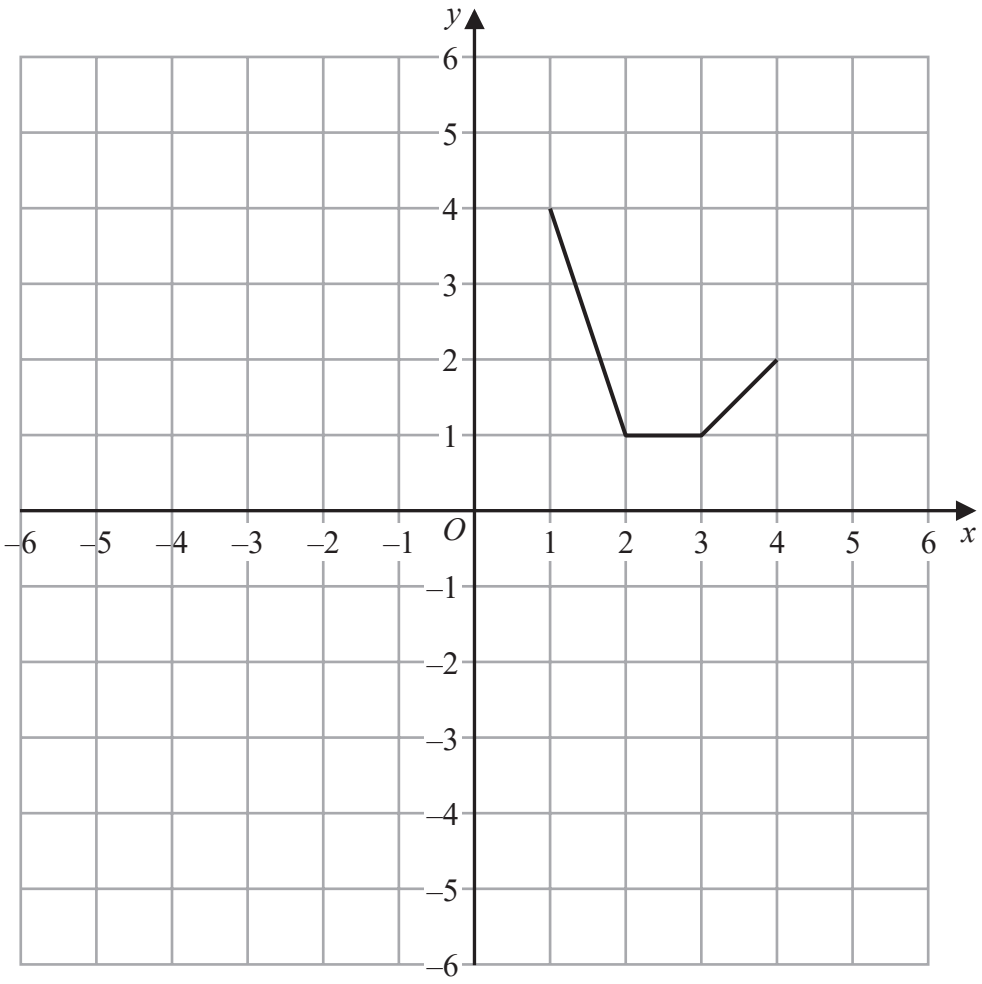
(b) On the grid below, draw the graph of $y = f(2x)$



(2)

(Total for Question 17 is 4 marks)

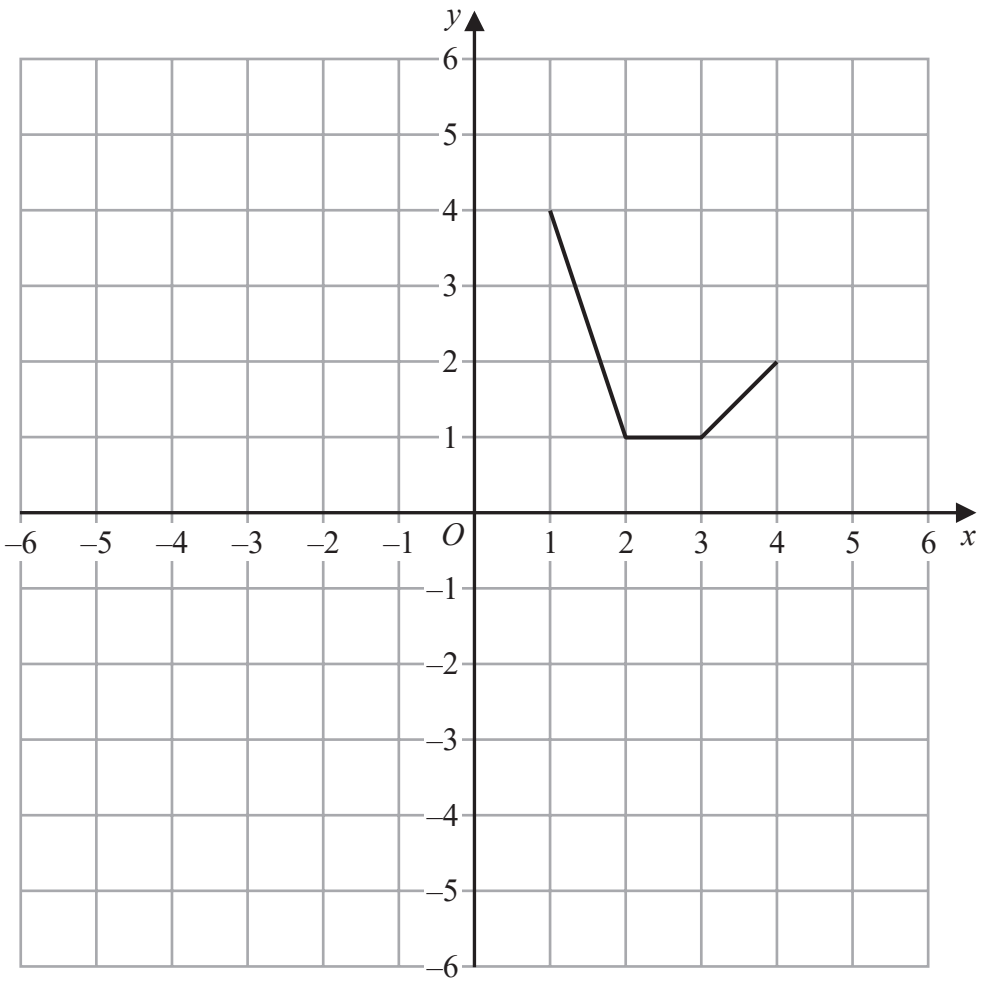
20 Here is the graph of $y = f(x)$



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

(2)

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



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

(2)

(Total for Question 20 is 4 marks)