

Name

Class



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Nonlinear 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.

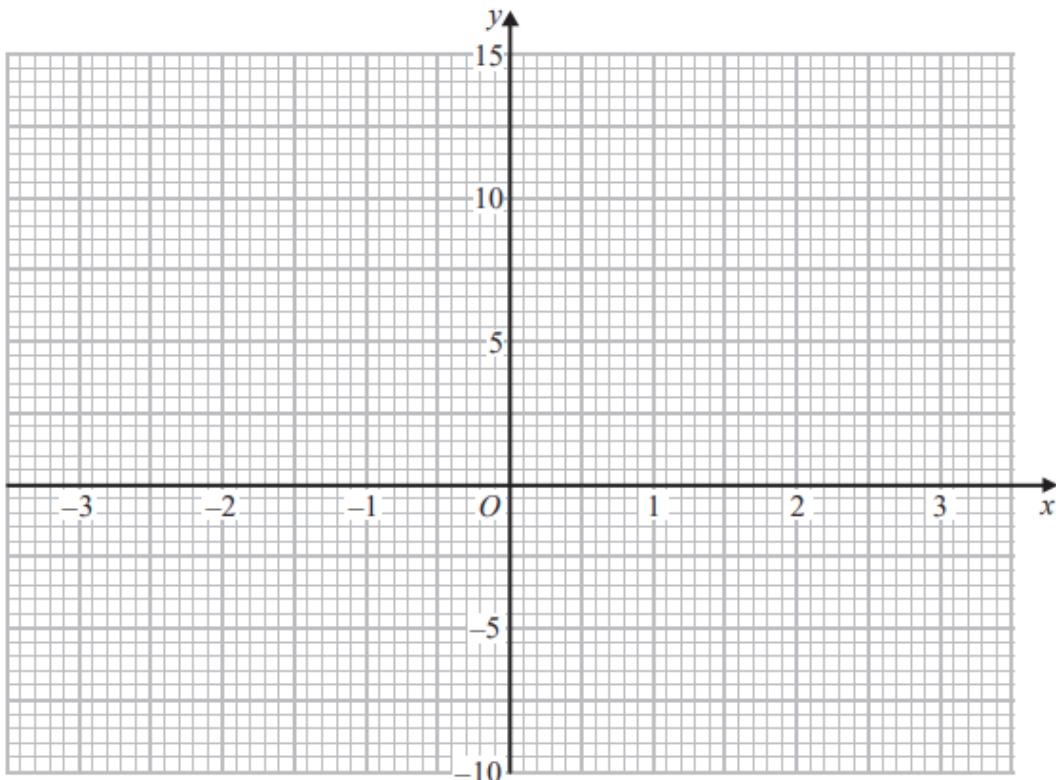
3 (a) Complete this table of values for $y = x^2 + x - 4$



x	-3	-2	-1	0	1	2	3
y		-2	-4		-2		

(2)

(b) On the grid, draw the graph of $y = x^2 + x - 4$ for values of x from -3 to 3



(2)

(c) Use the graph to estimate a solution to $x^2 + x - 4 = 0$

(1)

4 (a) Complete the table of values for $y = x^2 - 2x + 2$

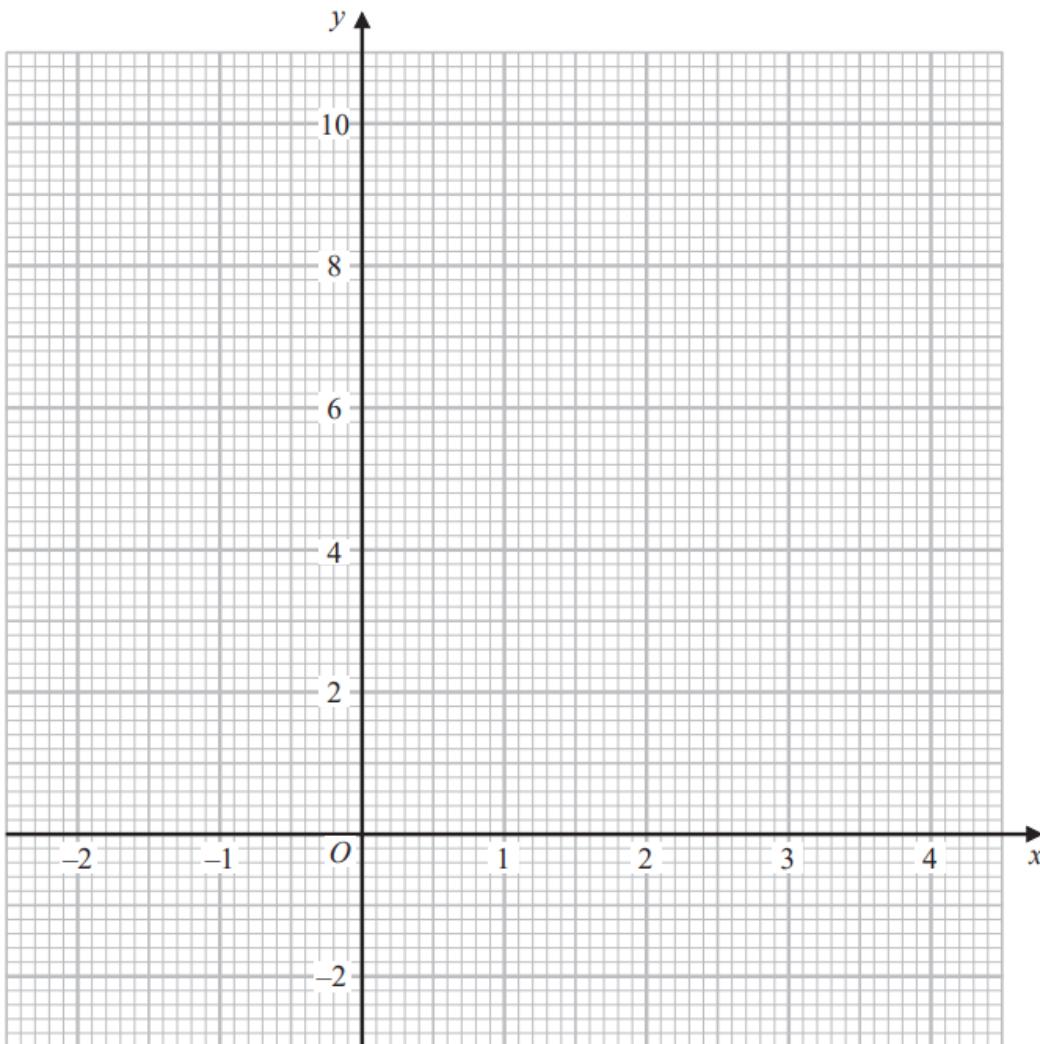


x	-2	-1	0	1	2	3	4
y	10		2			5	

(2)

(b) On the grid, draw the graph of $y = x^2 - 2x + 2$ for values of x from -2 to 4

(2)



(c) Use your graph to find estimates of the solutions of the equation $x^2 - 2x + 2 = 4$

(2)

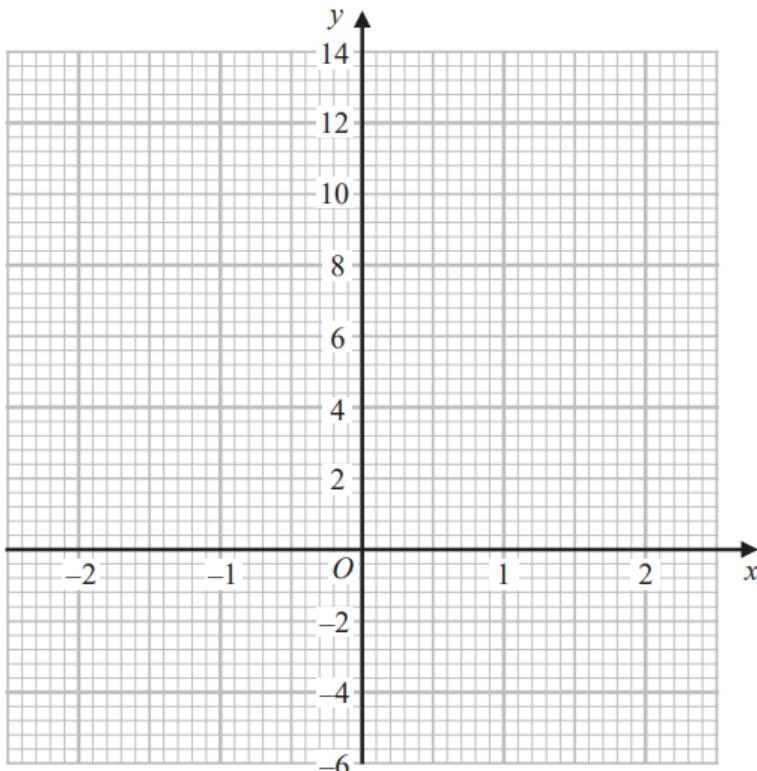
4 (a) Complete the table of values for $y = 5 - x^3$



x	-2	-1	0	1	2
y		6			

(2)

(b) On the grid below, draw the graph of $y = 5 - x^3$ for values of x from -2 to 2



(2)

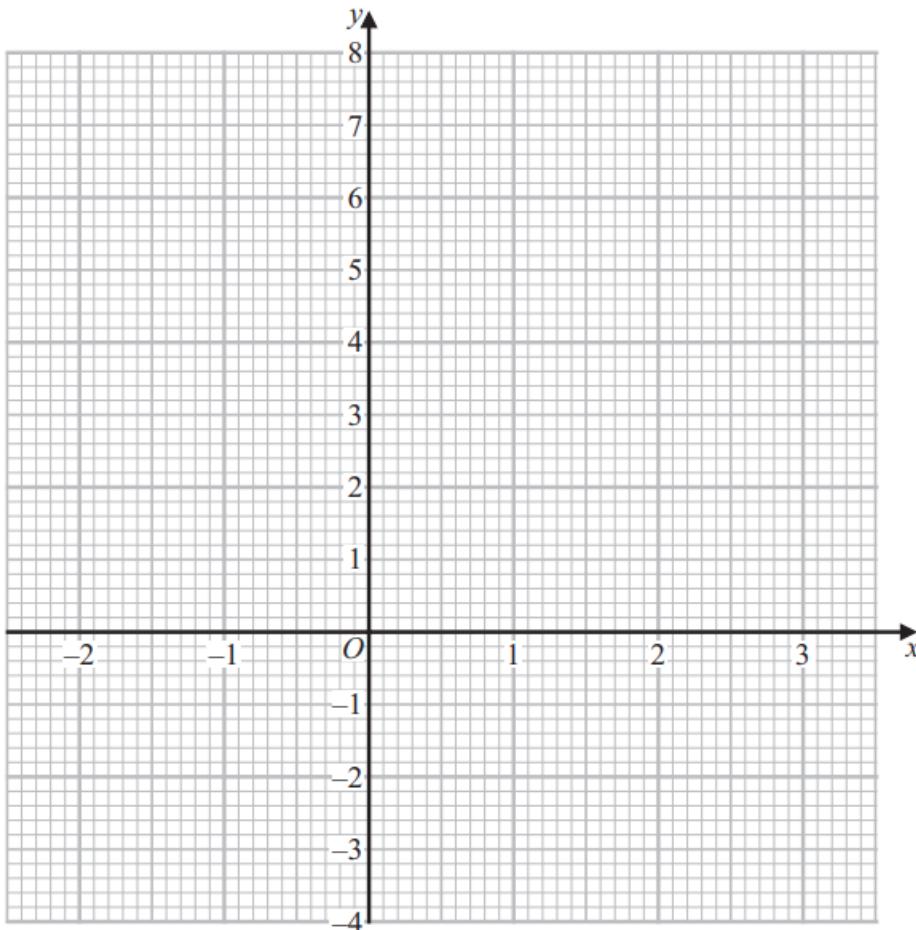
5 (a) Complete the table of values for $y = x^2 - x$

x	-2	-1	0	1	2	3
y	6		0		2	



(2)

(b) On the grid, draw the graph of $y = x^2 - x$ for values of x from -2 to 3



(2)

(c) Use your graph to find estimates for the solutions of the equation $x^2 - x = 4$

(2)

5 (a) Complete the table of values for $y = x^2 - x - 6$

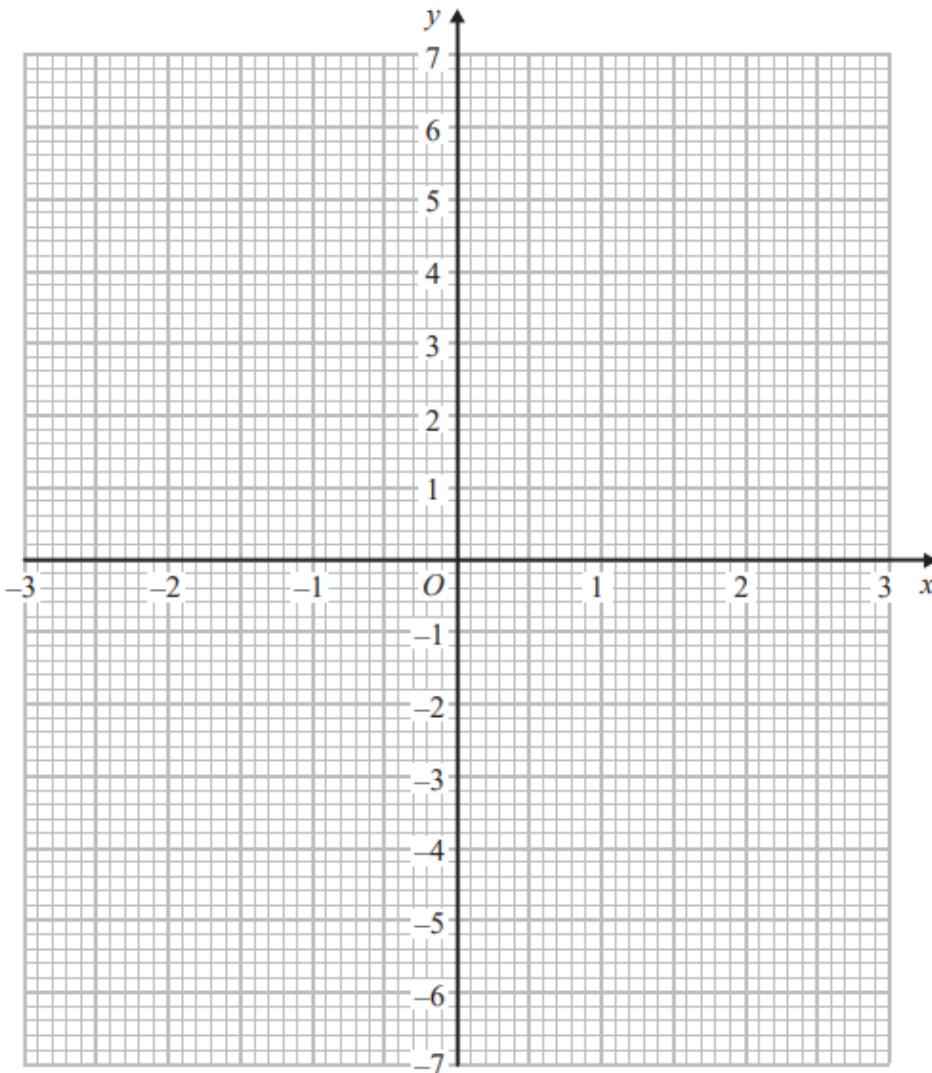
x	-3	-2	-1	0	1	2	3
y	6			-6			



(2)

(b) On the grid, draw the graph of $y = x^2 - x - 6$ for values of x from -3 to 3

(2)



(c) Use your graph to find estimates of the solutions to the equation $x^2 - x - 6 = -2$

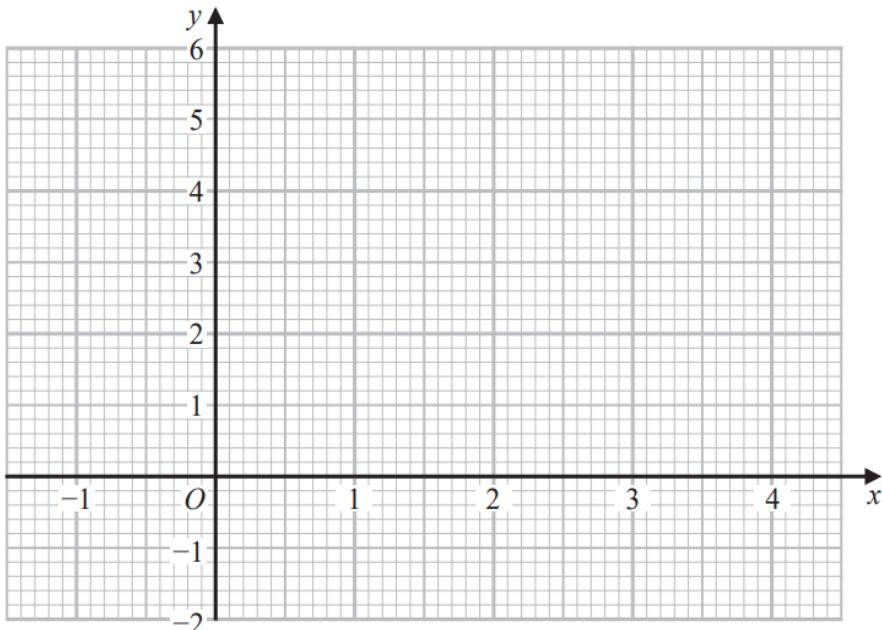
(2)

6 (a) Complete the table of values for $y = x^2 - 3x + 1$

x	-1	0	1	2	3	4
y		1	-1			

(2)

(b) On the grid, draw the graph of $y = x^2 - 3x + 1$ for values of x from -1 to 4

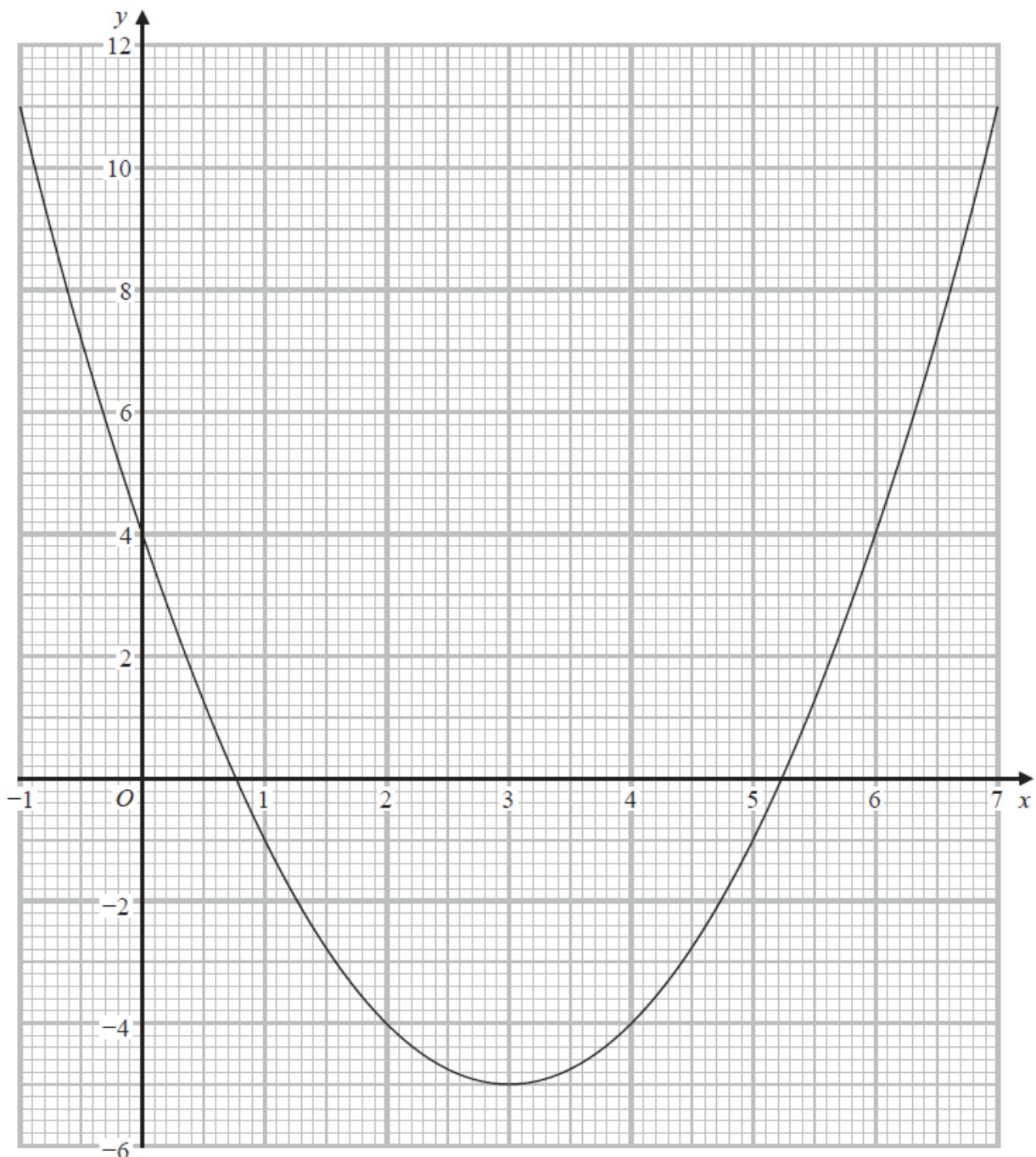


(2)

(c) Using your graph, find estimates for the solutions of the equation $x^2 - 3x + 1 = 0$

.....
(2)

7 Here is the graph of $y = x^2 - 6x + 4$



(a) Write down the y intercept of the graph of $y = x^2 - 6x + 4$

.....
(1)

(b) Write down the coordinates of the turning point of the graph of $y = x^2 - 6x + 4$

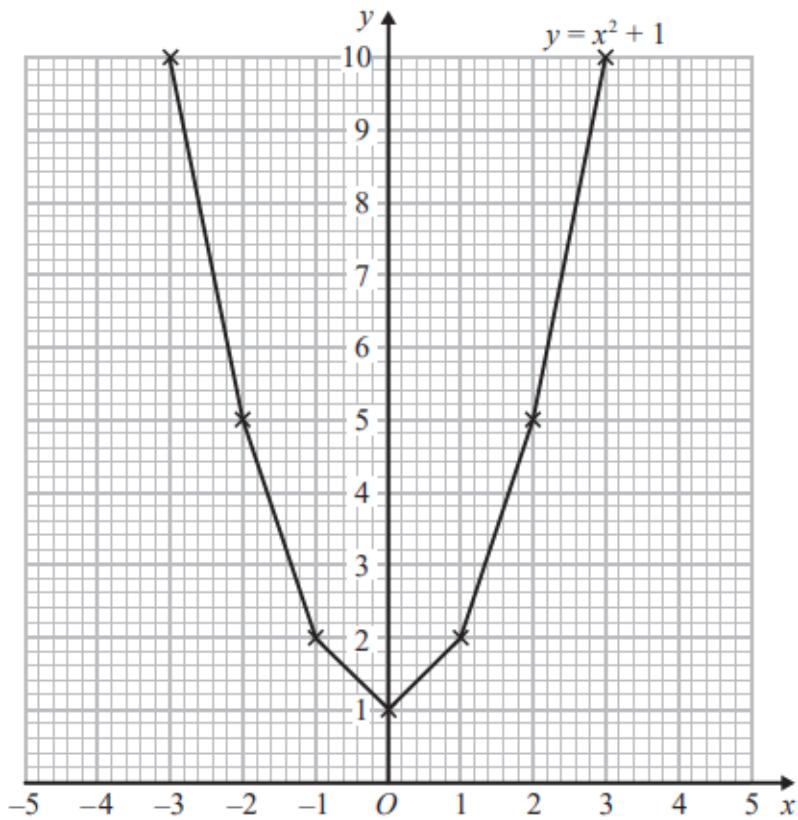
(.....,)
(1)

(c) Use the graph to find estimates for the roots of $x^2 - 6x + 4 = 0$

.....
(2)

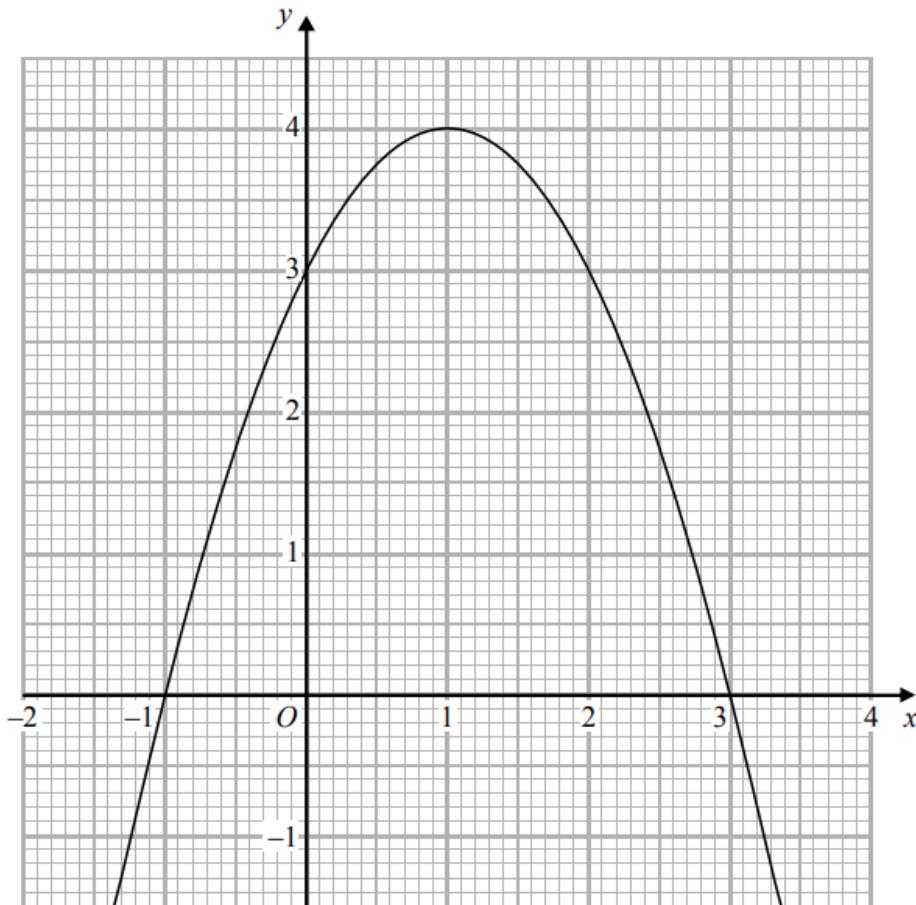
7 Brogan needs to draw the graph of $y = x^2 + 1$

Here is her graph.



Write down one thing that is wrong with Brogan's graph.

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



(a) Write down the coordinates of the turning point of the graph.

(.....,)
(1)

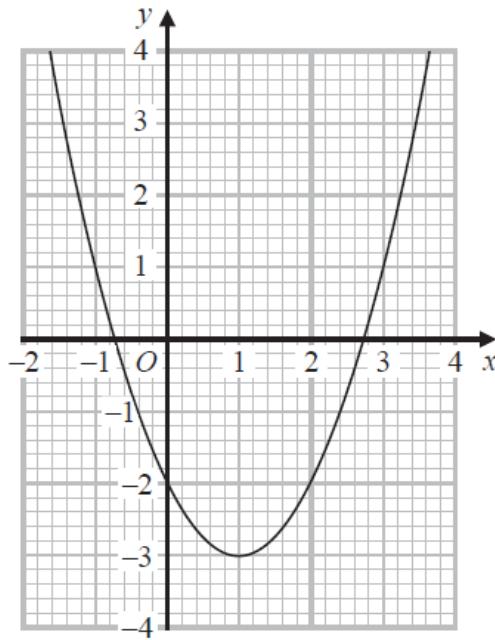
(b) Write down the roots of $f(x) = 2$

.....
(1)

(c) Write down the value of $f(0.5)$

.....
(1)

7 Here is the graph of $y = x^2 - 2x - 2$



(a) Write down the coordinates of the turning point on the graph of $y = x^2 - 2x - 2$

(.....,)
(1)

(b) Write down an estimate for one of the roots of $x^2 - 2x - 2 = 0$

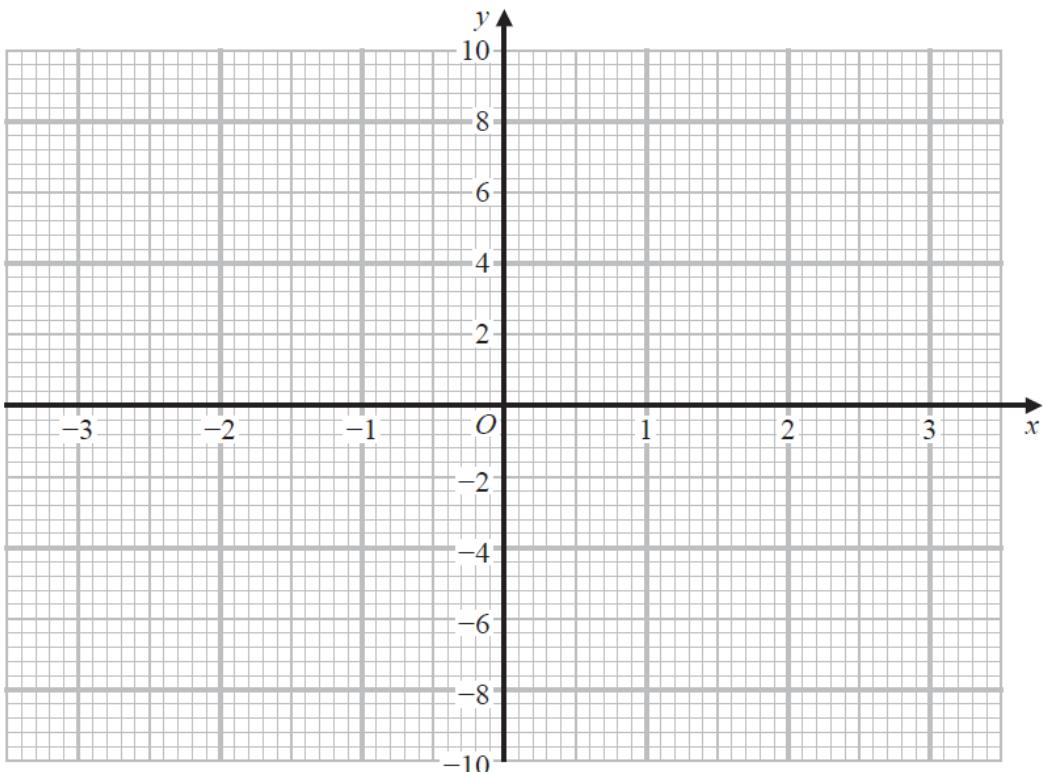
.....
(1)

9 (a) Complete the table of values for $y = 6x - x^3$

x	-3	-2	-1	0	1	2	3
y	9					4	-9

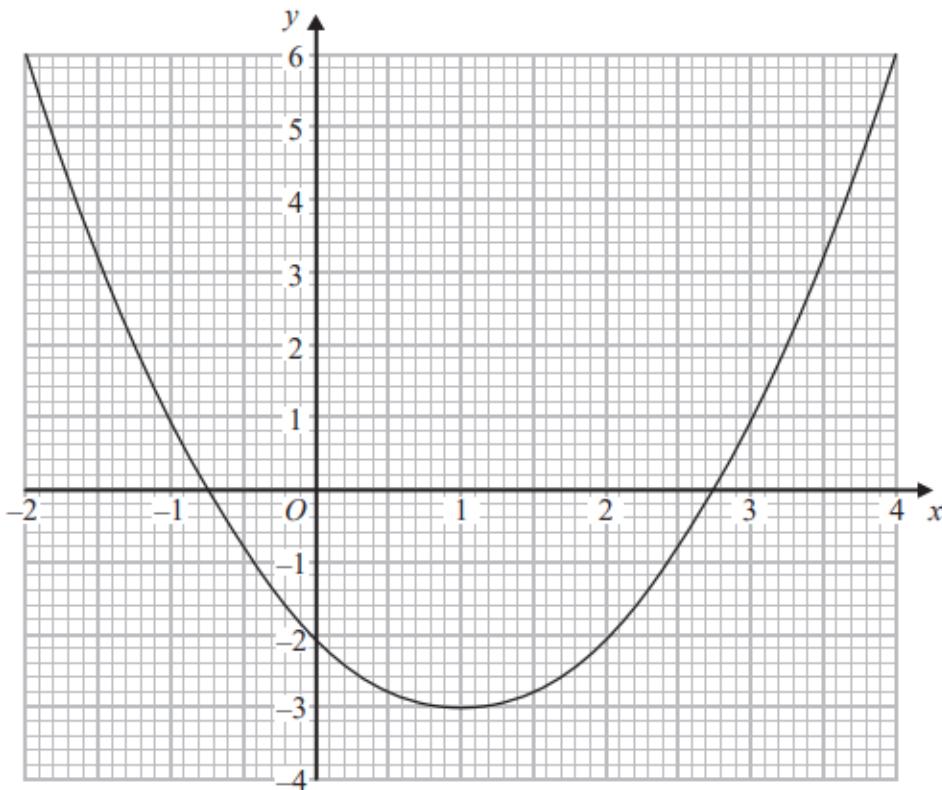
(2)

(b) On the grid, draw the graph of $y = 6x - x^3$ for values of x from -3 to 3



(2)

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



(a) Write down the coordinates of the turning point of the graph.

(.....,)
(1)

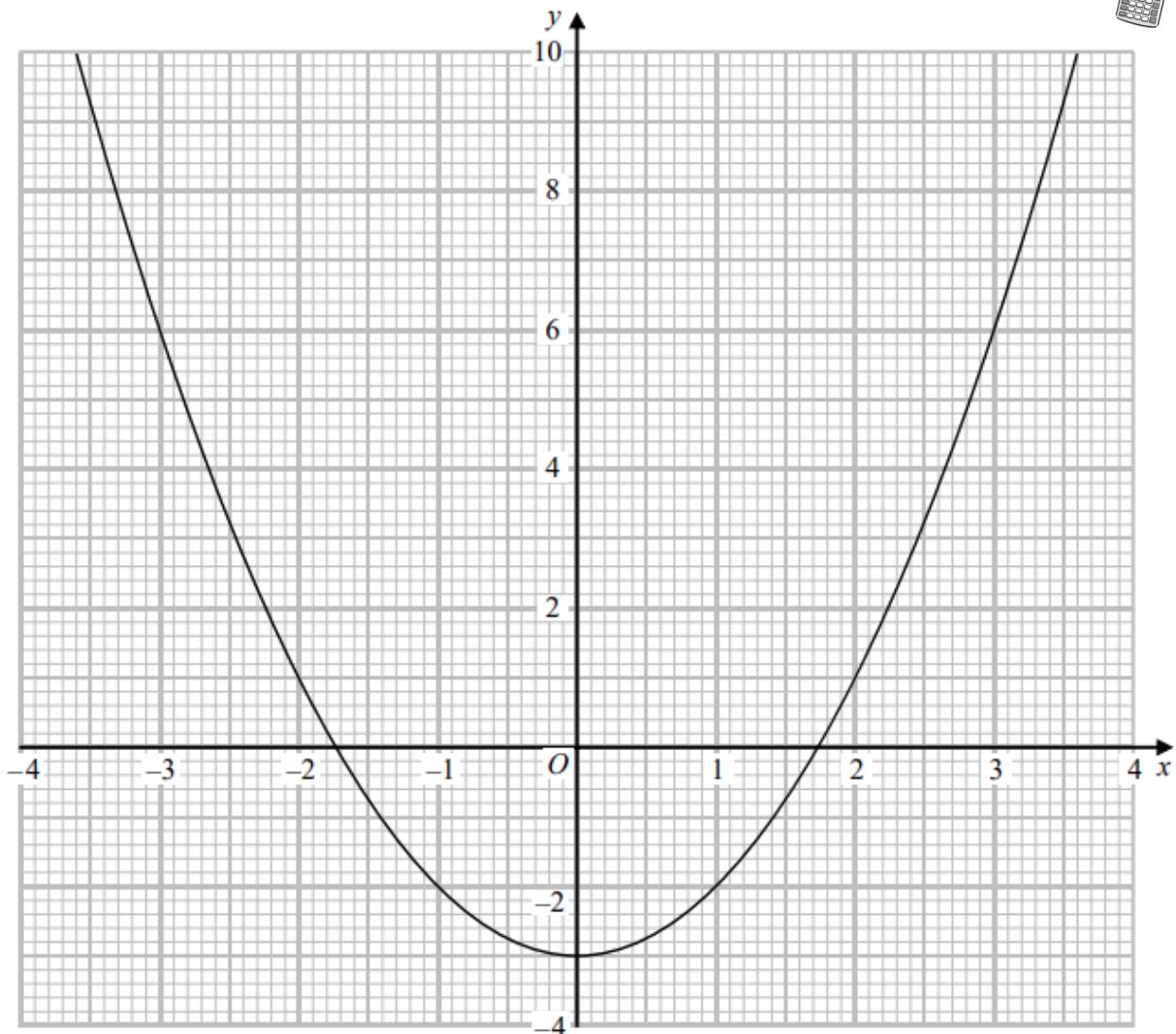
(b) Write down estimates for the roots of $f(x) = 0$

.....
(1)

(c) Use the graph to find an estimate for $f(1.5)$

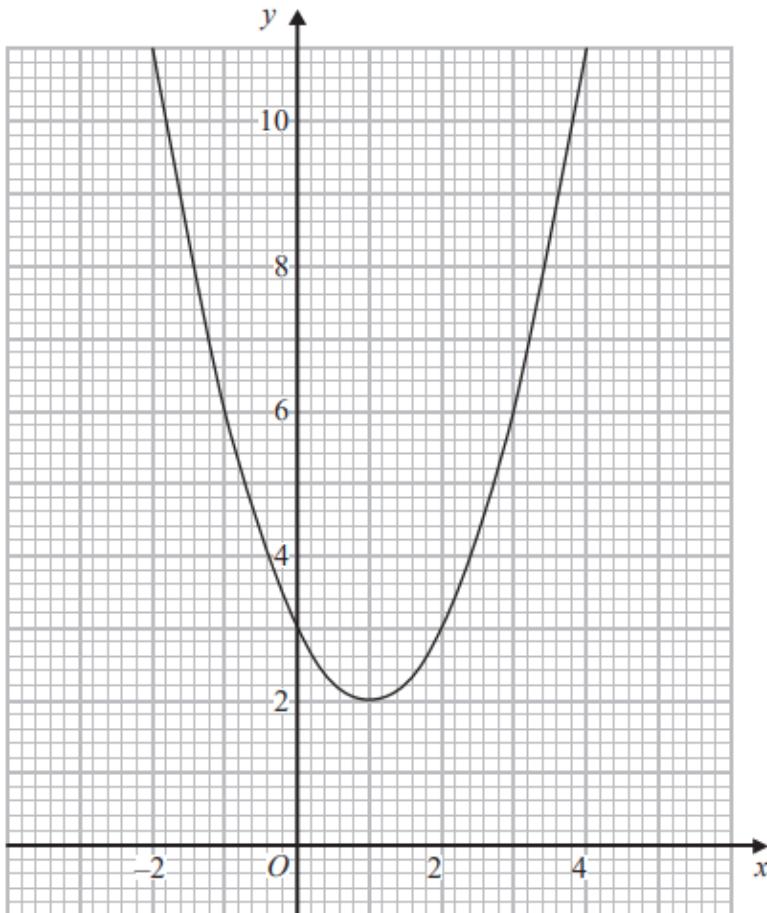
.....
(1)

17 Here is the graph of $y = x^2 - 3$



Use the graph to find estimates for the solutions to the equation $x^2 - 2x - 2 = 0$
You must show how you get your solutions.

20 The diagram shows part of the graph of $y = x^2 - 2x + 3$



(a) By drawing a suitable straight line, use your graph to find estimates for the solutions of $x^2 - 3x - 1 = 0$

(2)

P is the point on the graph of $y = x^2 - 2x + 3$ where $x = 2$

(b) Calculate an estimate for the gradient of the graph at the point P .

(3)

21 Sketch the graph of

$$y = 2x^2 - 8x - 5$$

showing the coordinates of the turning point and the exact coordinates of any intercepts with the coordinate axes.