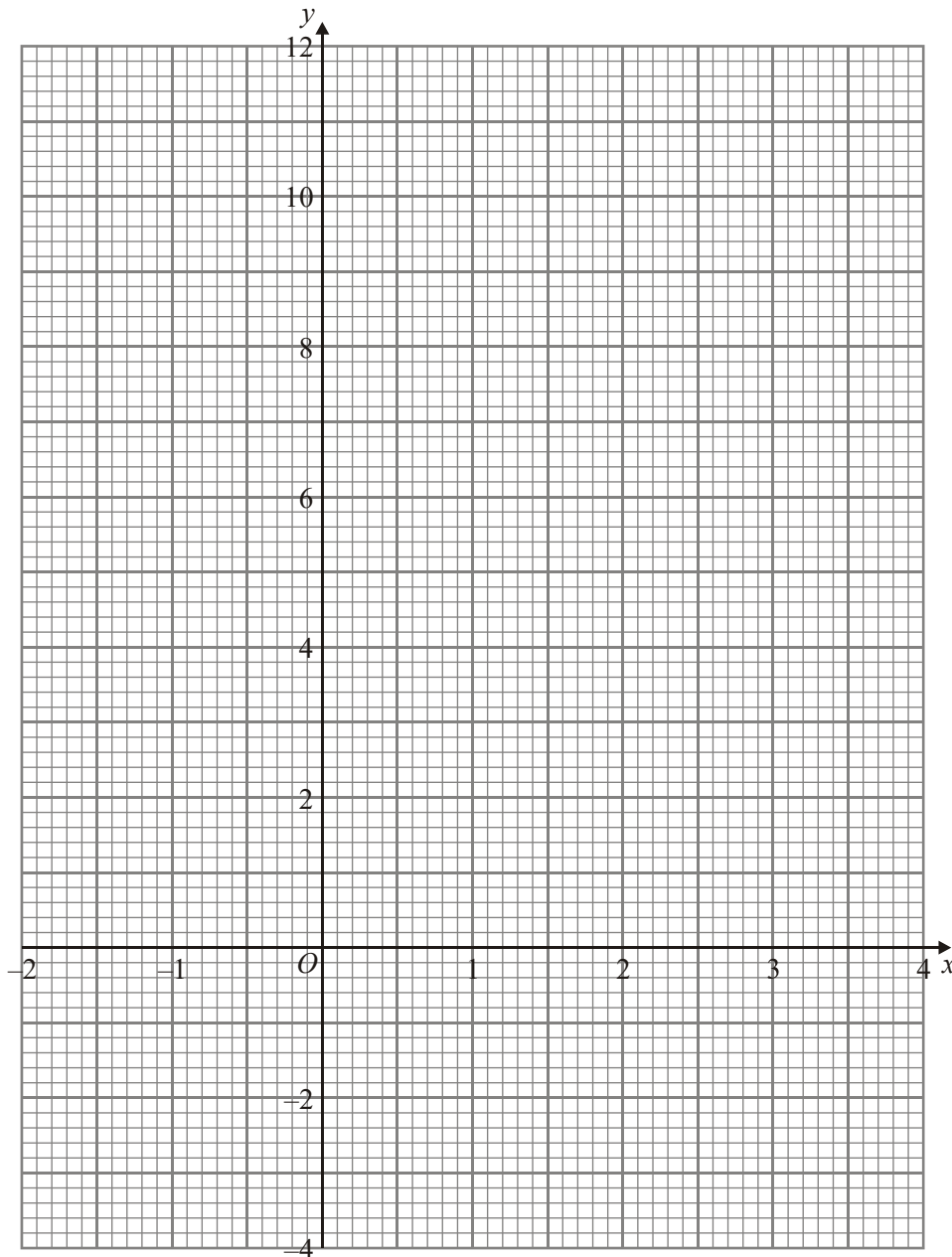


1. (a) Complete the table of values for  $y = x^2 - 3x + 1$

$x$	-2	-1	0	1	2	3	4
$y$	11		1	-1			5

(2)

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



(2)

- (c) Use your graph to estimate the values of  $x$  for which  $y = 3$

$x = \dots\dots\dots$

$x = \dots\dots\dots$

(2)

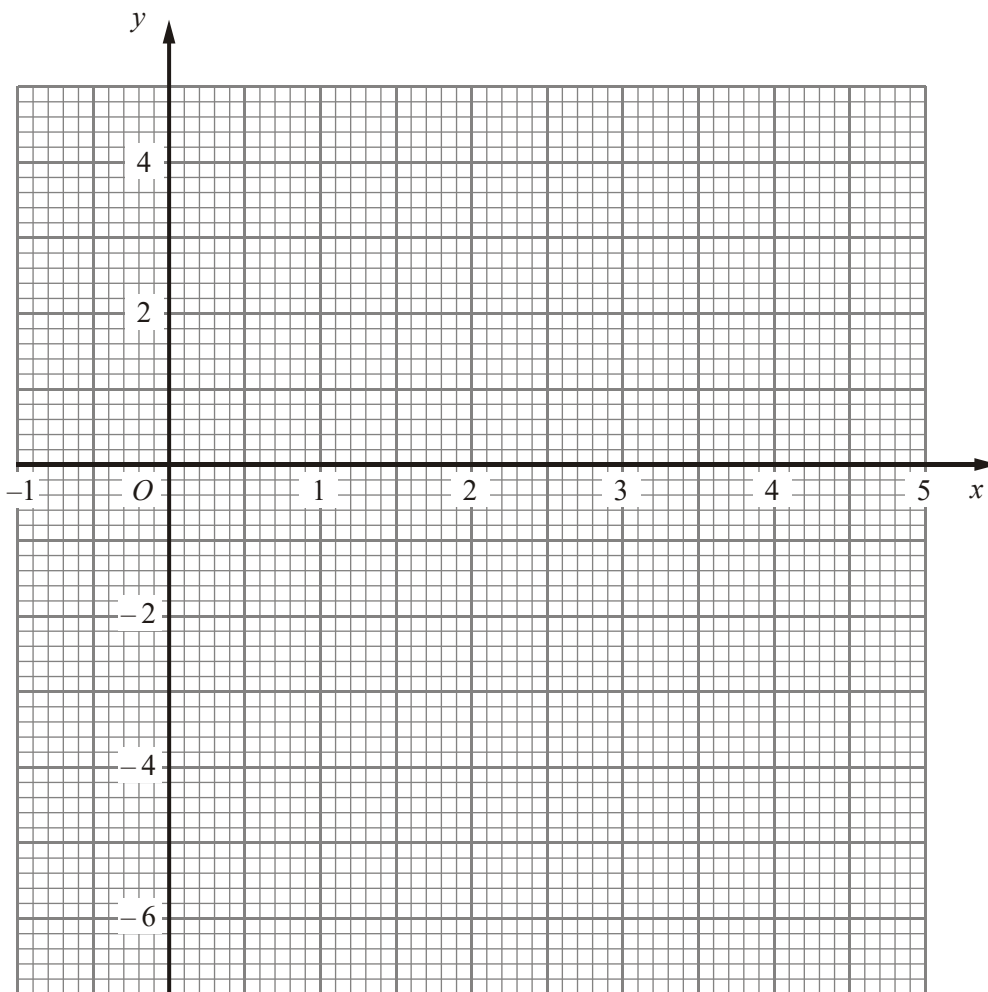
(Total 6 marks)

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

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

(2)

(b) On the grid, draw the graph of  $y = x^2 - 4x - 2$



(2)

(c) Use your graph to estimate the values of  $x$  when  $y = -3$

$x = \dots\dots\dots$

$x = \dots\dots\dots$

(2)  
(Total 6 marks)

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

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

(2)

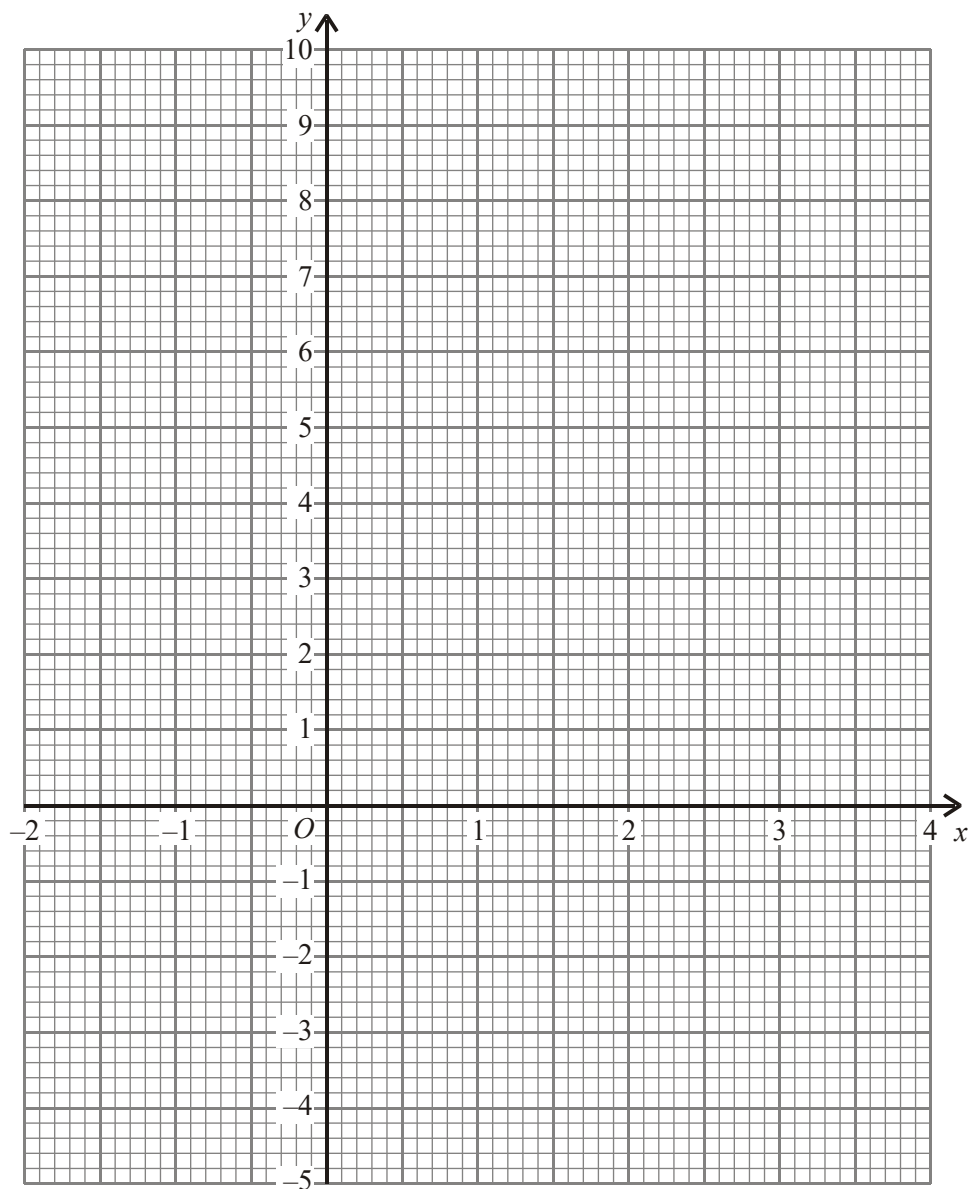
- (b) On the grid below, draw the graph of  $y = x^2 - 3x - 1$ .

(2)

- (c) Use your graph to find an estimate for the minimum value of  $y$ .

.....

(1)



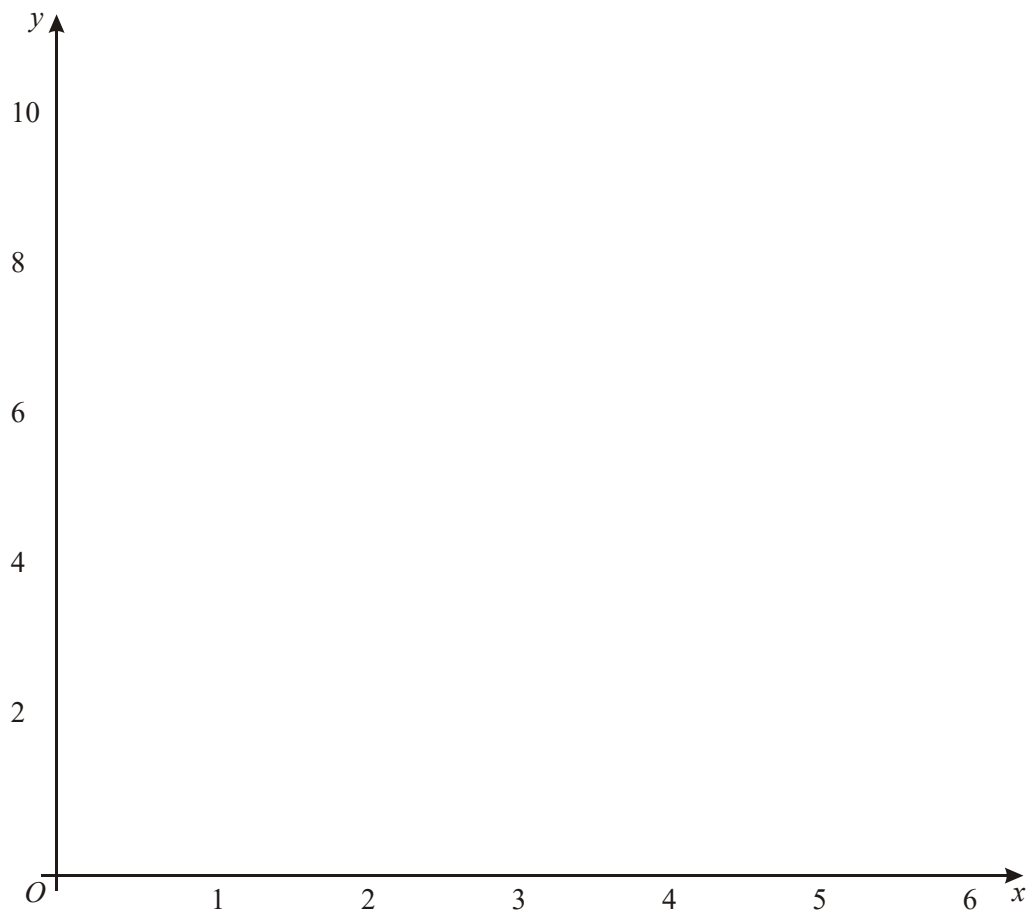
(Total 5 marks)

4. (a) Complete the table of values for  $y = x^2 - 6x + 10$

$x$	0	1	2	3	4	5	6
$y$	10						10

(2)

- (b) On the grid draw the graph of  $y = x^2 - 6x + 10$



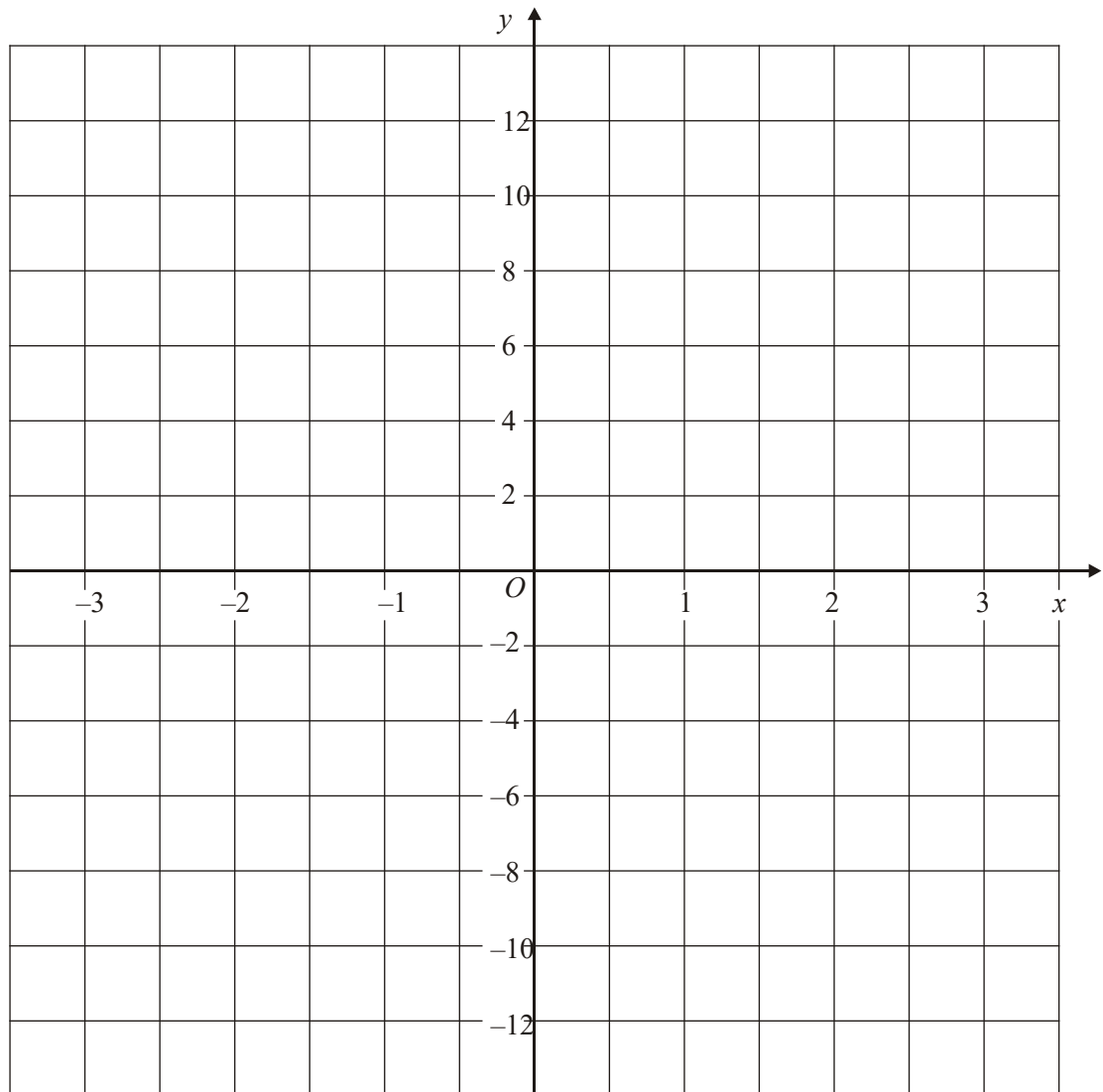
(2)  
(Total 4 marks)

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

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

(2)

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



(2)  
(Total 4 marks)

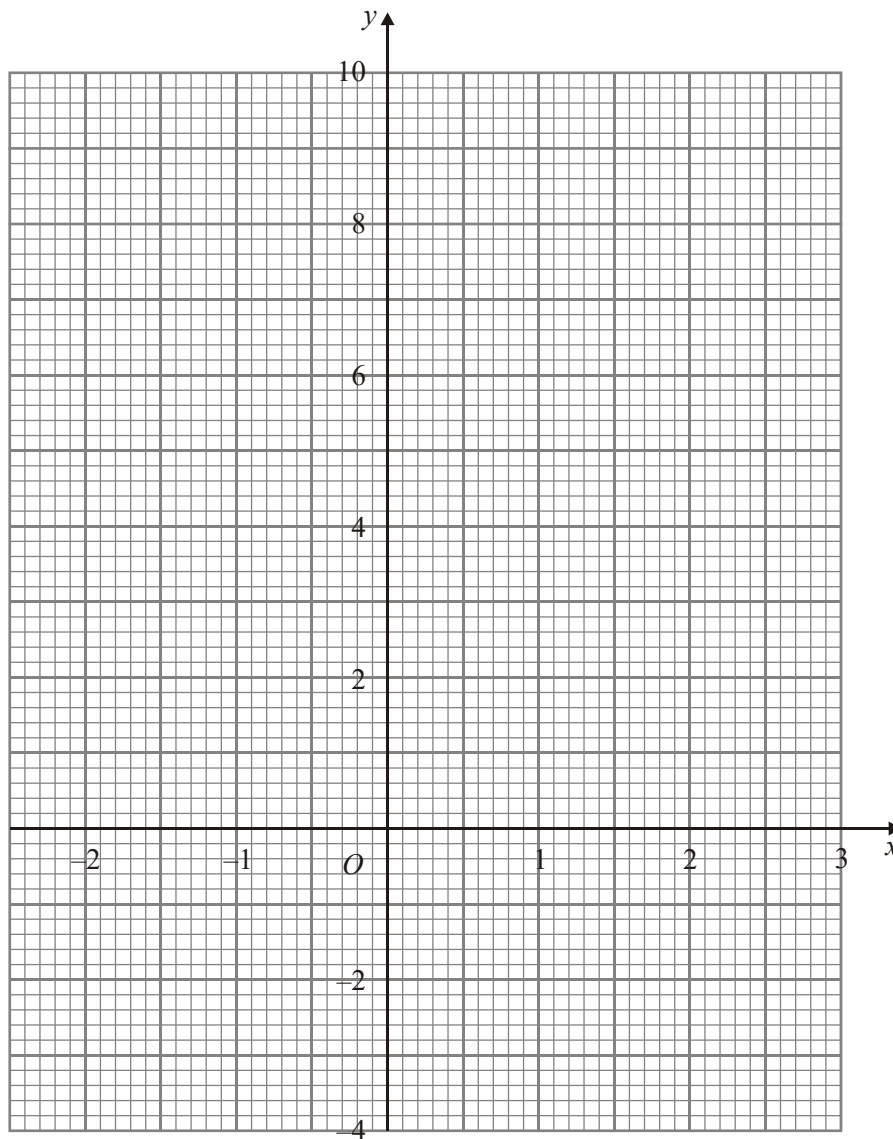
6. (a) Complete the table of values for  $y = x^2 - 3x - 1$

$x$	-2	-1	0	1	2	3
$y$		3	-1	-3		

(2)

(b) On the grid, draw the graph of  $y = x^2 - 3x - 1$

(2)



(Total 4 marks)

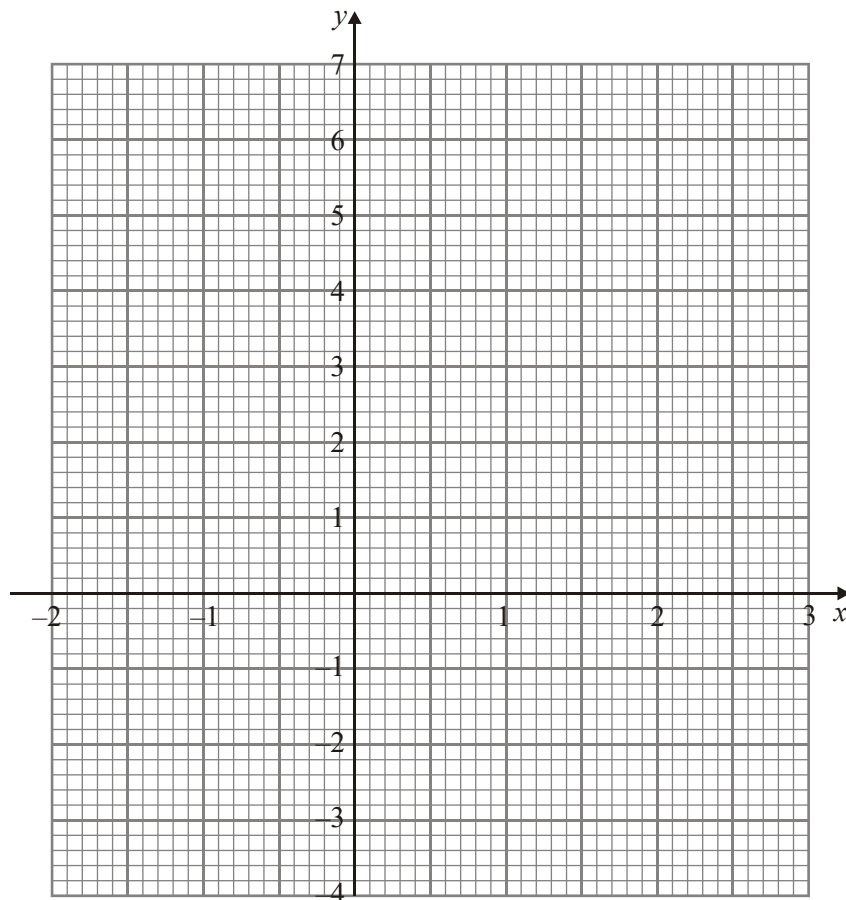
7. (a) Complete the table of values for  $y = x^2 - 3$

$x$	-2	-1	0	1	2	3
$y$	1		-3	-2		

(2)



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



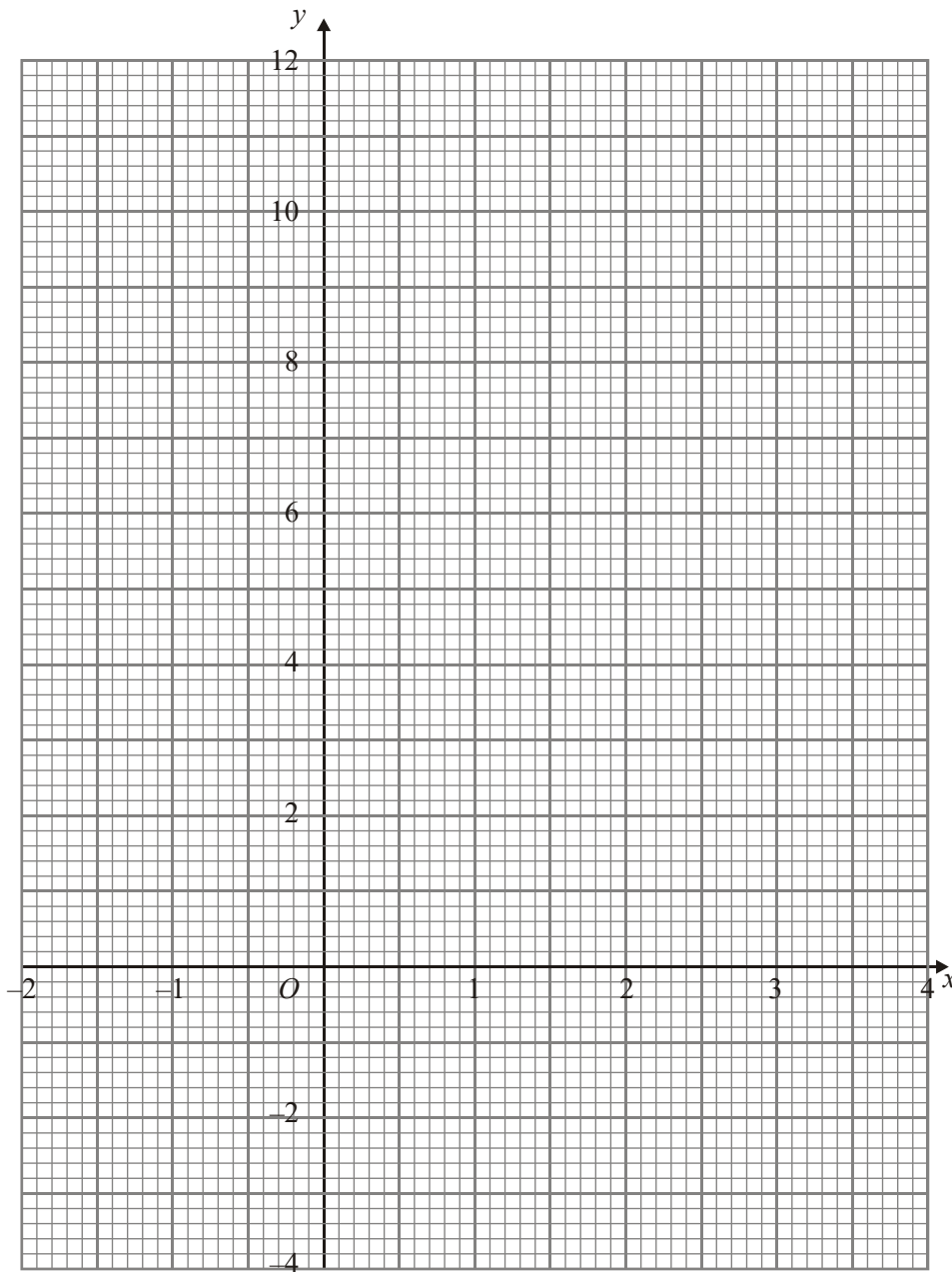
(2)  
(Total 4 marks)

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

$x$	-2	-1	0	1	2	3	4
$y$	11		1	-1			5

(2)

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



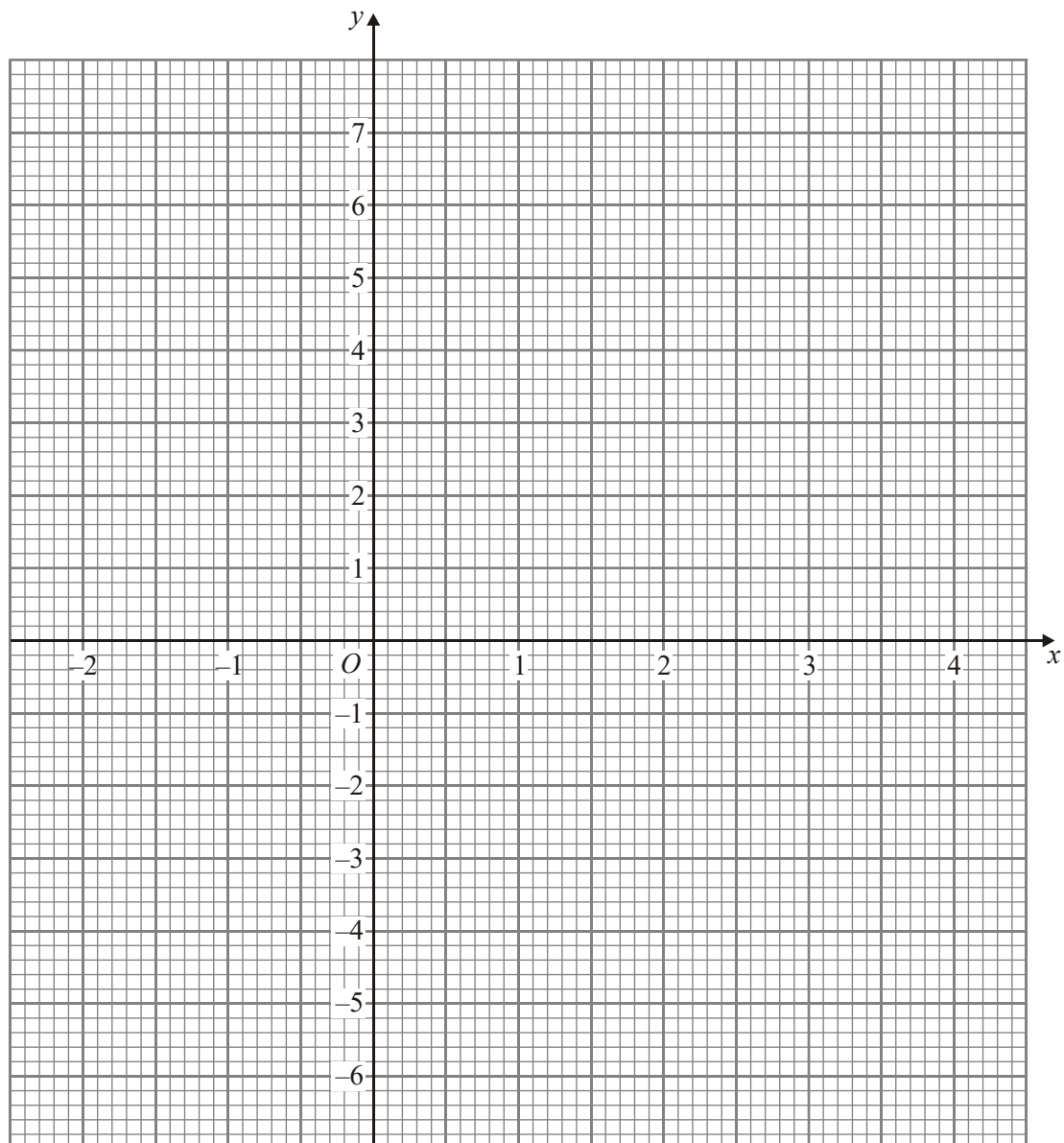
(2)  
(Total 4 marks)

9. (a) Complete the table for  $y = x^2 - 2x - 4$

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

(2)

- (b) On the grid, draw the graph of  $y = x^2 - 2x - 4$



(2)

(Total 4 marks)

1. (a) 5, -1, 1 2  
*B2 all three correct*  
*(B1 one or two correct)*

- (b) *B1 ft points plotted correctly  $\pm 1$  full square* 2  
*B1 smooth curve through their plotted points provided at least*  
*B1 awarded in (a).*

- (c) 3.6, -0.6 2  
*B2 for  $x = 3.4$  to  $3.8$  and  $-0.8$  to  $-0.4$  otherwise ft  $\pm 1$  full square*  
*depends on at least B1 in (b)*  
*(B1 for one value or line  $y = 3$  seen)*

[6]

2. (a)

x	-1	0	1	2	3	4	5
y	3	-2	-5	-6	-5	-2	3

- 3, -6, -5 2  
*B2 cao for all 3*  
*(B1 for any 1 or 2 correct)*

- (b) Quadratic graph 2  
*B2 for a fully correct graph*  
 OR  
*B1 for all 7 points ft on (a) plotted correctly  $\pm 1$  sq*  
*B1 for a smooth curve through all 7 of their plotted points*  
*depending on at least B1 in (a)*

- (c) Draw  $y = -3$  2  
 0.3, 3.7  
*B1 for 0.2 – 0.4 or ft from graph  $\pm 1$  square*  
*B1 for 3.6 – 3.8 or ft from graph  $\pm 1$  square*  
*(SC: If no marks earned then B1 for line  $y = -3$  drawn)*

[6]

3. (a) 9, -3, -1 2  
*B2 for complete correct table*  
*(B1 for any 1 correct)*
- (b) Graph 2  
*B1 (dep on at least B1 in (a)) ft for at least 5 points plotted*  
*correctly  $\pm \frac{1}{2}$  square*  
*B1 for smooth curve passing through at least 6 correct points*
- (c) -3.25 1  
*B1 ft from their graph provided there is a clear minimum*  
 *$\pm \frac{1}{2}$  sq*
- [5]**
4. (a) 5, 2, 1, 2, 5 2  
*B2 all 5 values correct*  
*(B1 for 2, 3 or 4 correct)*
- (b) smooth curve 2  
*B1 for points plotted  $\pm 1/2$  sq, condone 1 error*  
*B1 (dep at least on B1 in (a)) for a smooth curve*
- [4]**
5. (a) 6 2 0 0 2 6 12 2  
*B2 for fully correct table*  
*(B1 for 2 correct entries)*
- (b) Graph 2  
*B1 ft for points plotted correctly*  
*B1 (dep on at least B1 in (a)) for smooth curve*
- [4]**
6. (a) 9, -3, -1 2  
*B2 all correct*  
*(B1 any two correct)*
- (b) 2  
*B1 ft for all points plotted correctly*  
*B1 (ft if at least B1 in (a)), for a smooth curve through their*  
*plotted points*
- [4]**

7. (a)  $y = 1 - 2 - 3 - 2 \ 1 \ 6$  2  
*B2 for correct table*  
*(B1 for 1 or 2 correct entries)*
- (b) Points plotted accurately 2  
 Points joined with a smooth curve  
*B1 for all 6 points correctly plotted from "table"  $\pm 1$  full (2mm) square, if at least B1 awarded in part (a)*  
*B1 ft for any smooth curve if previous B1 gained*  
*NB: curve must pass within 1 full (2mm) square of the points*  
*[SC: B1 for 5 correctly plotted points joined by a smooth curve]*
- [4]**
8. (a) 5, -1, 1 2  
*B2 all three correct*  
*(B1 one or two correct)*
- (b) 2  
*B1 ft points plotted correctly  $\pm 1$  full square*  
*B1 smooth curve through their plotted points provided at least B1 awarded in (a).*
- [4]**
9. (a) -1, -4, 4 2  
*B2 for all 3 values correct*  
*(B1 for 1 or 2 values correct)*
- (b) 2  
*B1 ft for all 7 of their points correctly plotted*  
*B1 ft (dep on at least B1 in (a)) for smooth curve through all 7 of their points*
- [4]**

## 1. Intermediate Tier

Few candidates were able to gain any significant marks from this question. Most candidates were able to find only one value correct in the table, but then might have gained a mark for plotting the points from their table. A significant number misplotted the point (0,1). It was disappointing to find so many candidates joining the points with straight line segments, or joining two minimum points with a straight line. It was clear that few knew the basic shape of a quadratic graph, or were content to leave a totally inappropriate graph for marking. Some candidates earned at least one mark in part (c) by taking a reading from an appropriate graph, though sometimes did this inaccurately, particularly when this involved reading a negative number.

### Higher Tier

In part (a), most candidates were able to score at least one mark for a correct value in the table. A common error was in the calculation of  $y$  for  $x = -1$  (frequently as 3 or  $-1$ ). In part (b), many candidates could plot the points from their table. Most were able to join their points with a smooth curve, but there were a significant number who drew graphs with a “flat bottom”. Very few of the candidates who calculated a point at  $(-1, -1)$  realised from the shape of their graph that they had made a mistake in the table. In part (c), most candidates drew a line on their graph to solve the quadratic equation, but some forgot to include the minus sign with their solution at  $-0.5$ .

## 2. Foundation

Part (a) contained many errors, mostly from the inability of candidates to cope with the negative value of  $x$ , even with the aid of a calculator. 1 or  $-5$  were common incorrect values of  $y$  from  $x = -1$ .

In part (b) the plotting of their points was generally well done although few went on to provide a smooth curve joining the points. Unfortunately some candidates are still joining their points with straight lines although more often than not, their points were not joined at all.

Few understood what was required in part (c) with 0.5 and 3.5 being common incorrect answers when any answer was provided, with candidates just using their table to provide values of  $x$  between 0 and 1 and between 3 and 4. It was rare to see the line between 0 and 1 and between 3 and 4. It was rare to see the line  $y = -3$  drawn.

45% of candidates failed to score any marks at all on this question.

### Higher

- Most candidates scored at least 1 mark for the table. The most common error was to give  $y = 1$  when  $x = -1$ , arising from  $(-1)^2 = -1$ . Presumably candidates using their calculator omitted the brackets.
- The points were usually plotted correctly but a surprising number did not join the points.
- Those candidates who had drawn a graph tended to get this correct. 0.3 was seen more often than 3.7, in which case the second answer given was  $-0.3$ . It was rare for the line  $y = -3$  to be drawn.

3. The majority of candidates were able to fill in at least one value in the table correctly. The value for  $x = -3$  was, most often, evaluated incorrectly. There was some inaccurate plotting of points. Candidates should be made aware that points should be joined with a smooth curve not straight line segments.
4. The vast majority of candidates were able to score full marks on this question. There was some careless arithmetic or use of calculators leading to incorrect values in the table in a small minority of cases. Candidates should be reminded that a smooth curve should be used to join plotted points not line segments.
5. The usual problem with using a calculator to square negative numbers meant that many candidates evaluated the value of  $y$  when  $x = -2$  incorrectly. The value of  $-2$  rather than  $0$  was frequently seen.
6. Many candidates had difficulties in calculating the value of  $y$  when  $x = -3$ . The incorrect value of  $-3$  or  $1$  was frequently seen. There was some careless evidence of plotting with  $(0, -1)$  plotted at  $(0, 1)$  being the most common error. Straight line segments were often used to join plotted points. Candidates did not seem to be aware of the general shape of a quadratic curve.
7. Many candidates, in part (a) were able to gain at least one mark for one correctly evaluated entry in the table of values; most often this was  $1$  ( $x = 2$ ) or  $6$  ( $x = 3$ ). Substitution of  $x = -1$  often led to an answer of  $-4$ . This was usually followed by correct plotting of points and joining them up but not often with a “smooth” curve. A great number of candidates in part (a) tried to complete a linear pattern in the table and  $2$  ( $x = -1$ ),  $-1$  ( $x = 2$ ) and  $0$  ( $x = 3$ ) were often seen. Candidates following this line of thought failed to score in both parts of the question.
8. In part (a) often at least one mark was scored, usually for the correct substitution of  $x = 3$ . Many candidates, however, failed to score in this part but could pick up one mark in part (b) for correctly plotting the coordinates of their points. In part (b) many candidates lost marks for joining their points with line segments instead of with a smooth curve, particularly between the points  $(1, -1)$  and  $(2, -1)$  where a horizontal line was commonplace.



9. The table in part (a) usually yielded at least 1 mark. As anticipated, the major error was with dealing with  $x = -1$ , where the answer  $-5$  often appeared, presumably from  $1 - (2 + 4)$ . Other incorrect values looked as if they came from squaring  $-1$  and getting  $-1$ .

Candidates were generally successful in transferring the table values onto the graph and most drew a smooth curve through their points to pick up the final two marks, although there were still some who joined their points with straight line segments.