



ACHIEVE ACADEMY

GCSE Maths — Higher Tier

Quadratic, Cubic & Reciprocal Graphs · Practice Booklet

NAME: _____

CLASS: _____

DATE: _____

☐ Developing

☐ Secure

☐ Greater Depth

Answer every question in the working space provided. Method marks are available for correct working even if the final answer is wrong. Check the time allowed with your tutor before you start.

Quadratic, Cubic & Reciprocal Graphs

Total marks available: 99

● Quadratic, Cubic & Reciprocal Graphs

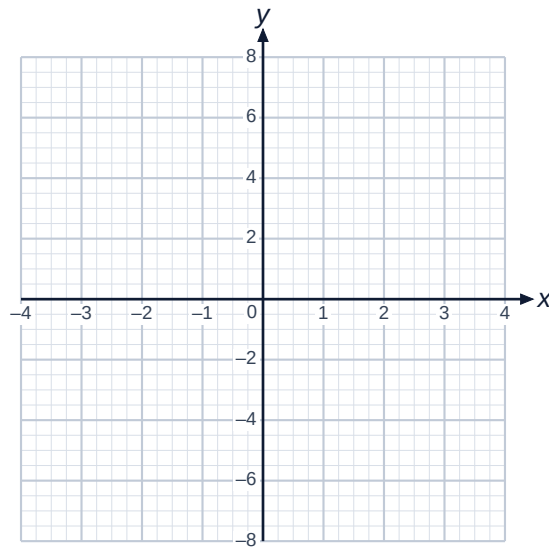
Q1

[4 marks]

(a) Complete the table of values for $y = \frac{4}{x}$.

(b) On the grid, draw the graph of $y = \frac{4}{x}$ for values of x from -4 to 4 ($x \neq 0$).

x	-4	-2	-1	-0.5	0.5	1	2	4
y	-1			-8	8	4		1



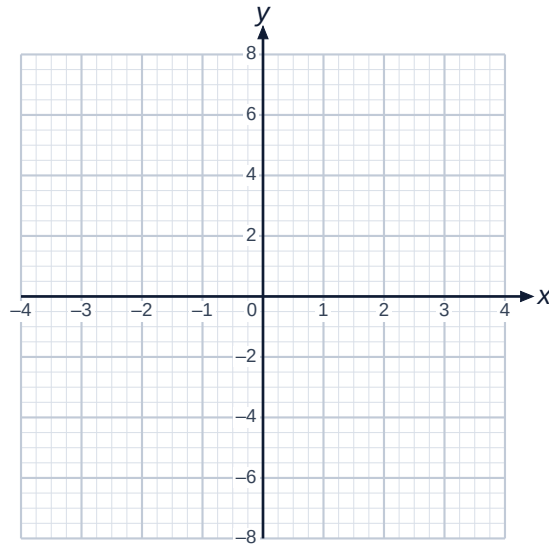
Q2

[4 marks]

(a) Complete the table of values for $y = \frac{4}{x}$.

(b) On the grid, draw the graph of $y = \frac{4}{x}$ for values of x from -4 to 4 ($x \neq 0$).

x	-4	-2	-1	-0.5	0.5	1	2	4
y	-1		-4	-8		4	2	



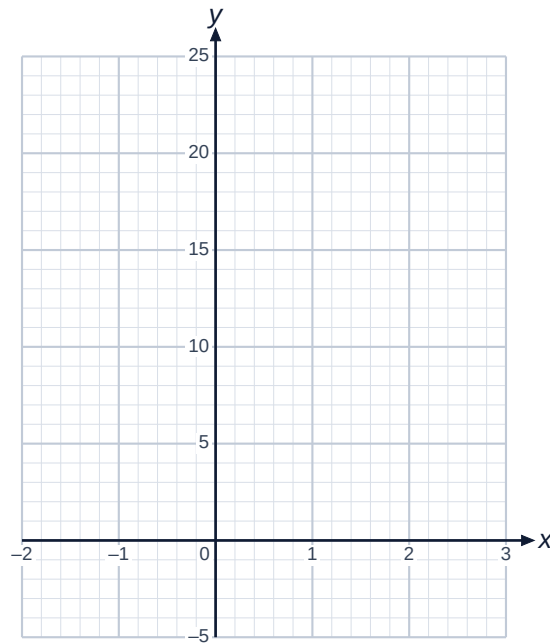
Q3

[4 marks]

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

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

x	-2	-1	0	1	2	3
y		-2			10	22



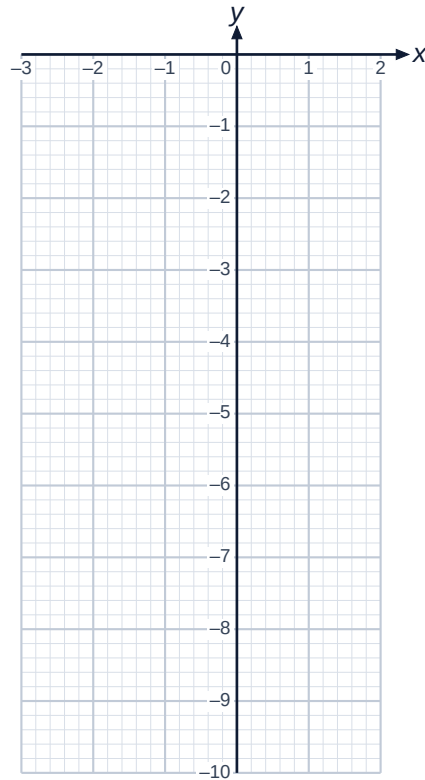
Q4

[4 marks]

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

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

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



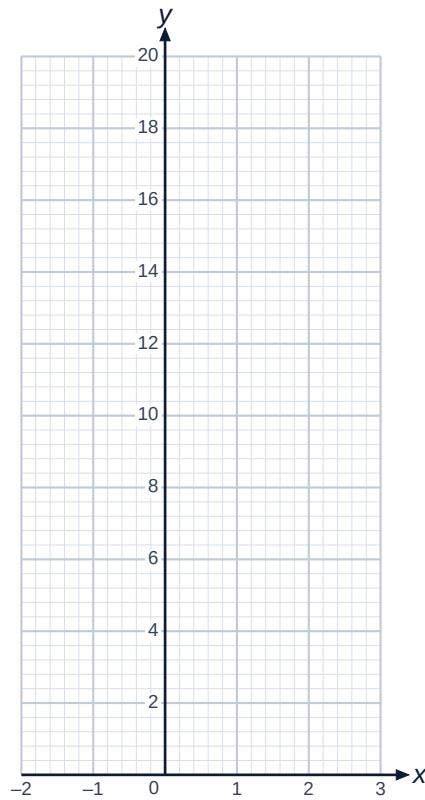
Q5

[4 marks]

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

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

x	-2	-1	0	1	2	3
y	20	10			4	



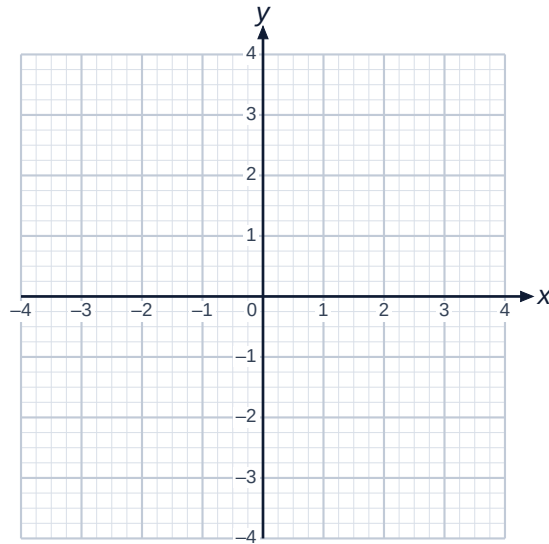
Q6

[4 marks]

(a) Complete the table of values for $y = \frac{2}{x}$.

(b) On the grid, draw the graph of $y = \frac{2}{x}$ for values of x from -4 to 4 ($x \neq 0$).

x	-4	-2	-1	-0.5	0.5	1	2	4
y	-0.5			-4		2	1	0.5



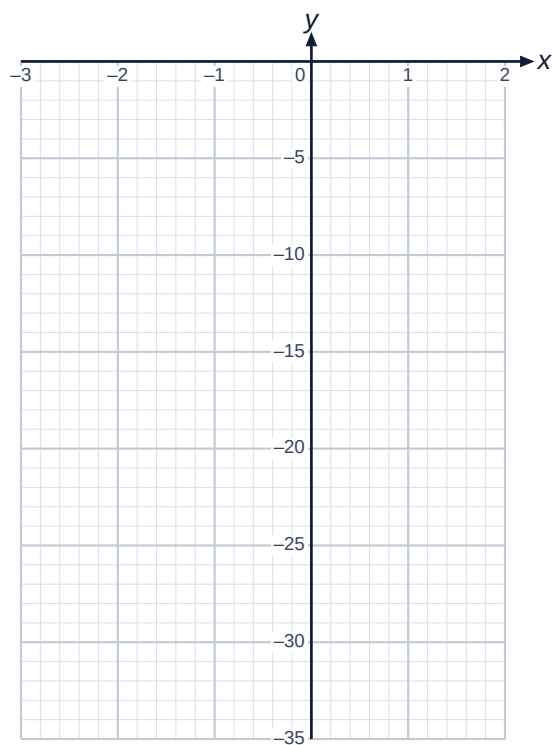
Q7

[4 marks]

(a) Complete the table of values for $y = -2x^2 + 4x - 5$.

(b) On the grid, draw the graph of $y = -2x^2 + 4x - 5$ for values of x from -3 to 2 .

x	-3	-2	-1	0	1	2
y		-21			-3	-5



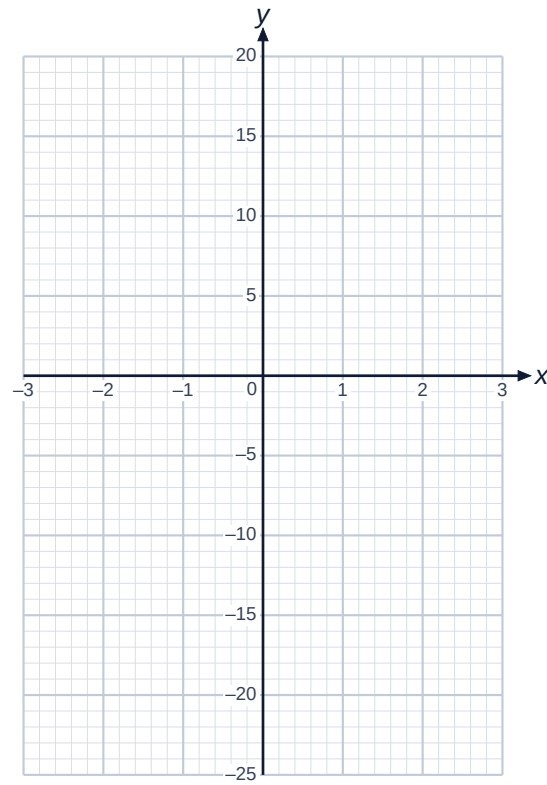
Q8

[2 marks]

Here is a table of values for $y = x^3 - 2x - 1$.

On the grid, draw the graph of $y = x^3 - 2x - 1$ for values of x from -3 to 3 .

x	-3	-2	-1	0	1	2	3
y	-22	-5	0	-1	-2	3	20



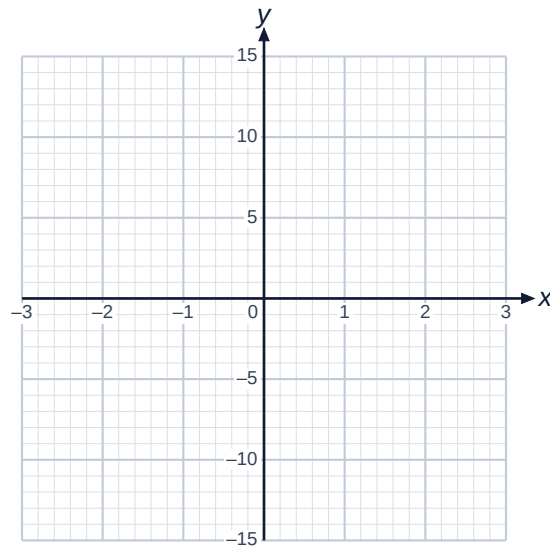
Q9

[2 marks]

Here is a table of values for $y = x^3 - 4x$.

On the grid, draw the graph of $y = x^3 - 4x$ for values of x from -3 to 3 .

x	-3	-2	-1	0	1	2	3
y	-15	0	3	0	-3	0	15



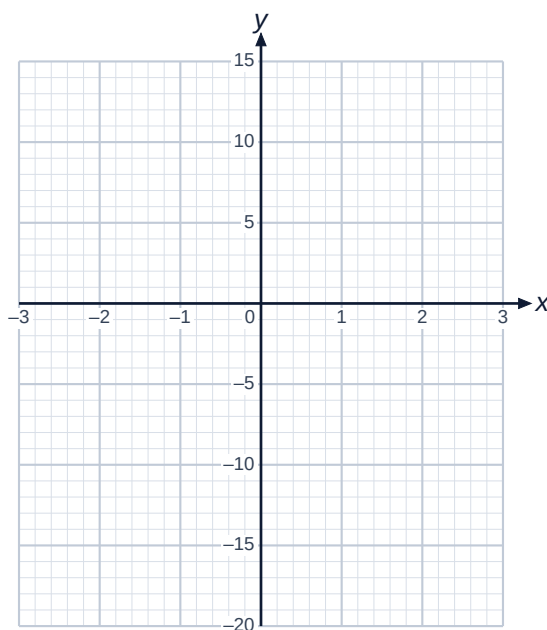
Q10

[2 marks]

Here is a table of values for $y = x^3 - 4x - 2$.

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

x	-3	-2	-1	0	1	2	3
y	-17	-2	1	-2	-5	-2	13



Q11

[3 marks]

By completing the square, write $y = x^2 - 10x - 7$ in the form $(x + p)^2 + q$, and hence state the coordinates of the turning point of the graph of $y = x^2 - 10x - 7$.

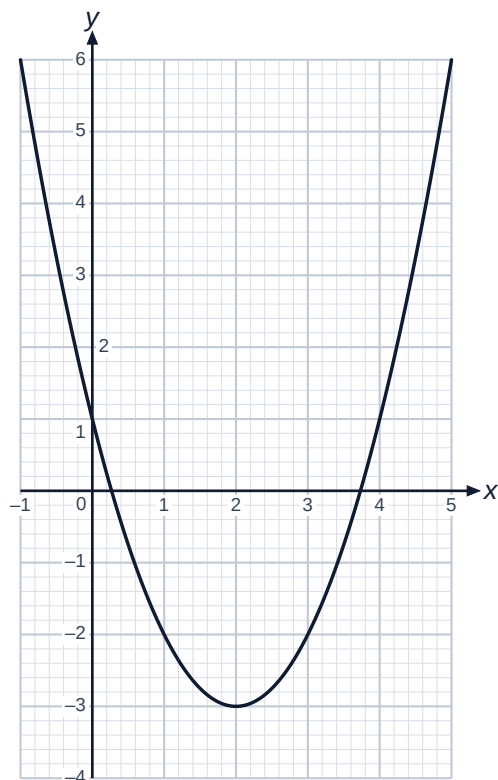
Q12

[4 marks]

The graph of $y = x^2 - 4x + 1$ is drawn on the grid.

(a) Use the graph to estimate the solutions of $x^2 - 4x + 1 = 0$.

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

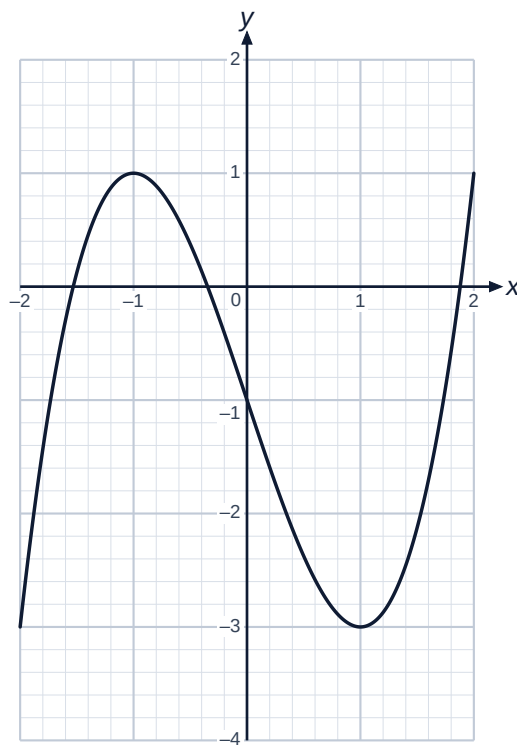


Q13

[5 marks]

The graph of $y = x^3 - 3x - 1$ is drawn on the grid.

- (a) Use the graph to estimate the solutions of $x^3 - 3x - 1 = 0$.
(b) Write down the coordinates of the turning points of the graph.



Q14

[3 marks]

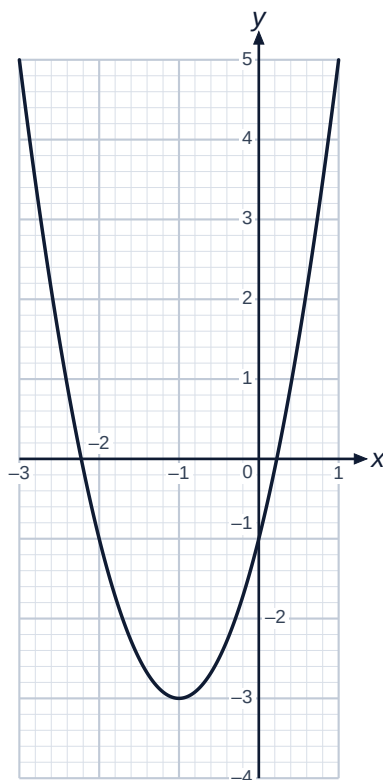
The graph of $y = x^2 - 3x - 54$ crosses the x -axis at two points. By factorising, find the coordinates of these two points.

Q15

[4 marks]

The graph of $y = 2x^2 + 4x - 1$ is drawn on the grid.

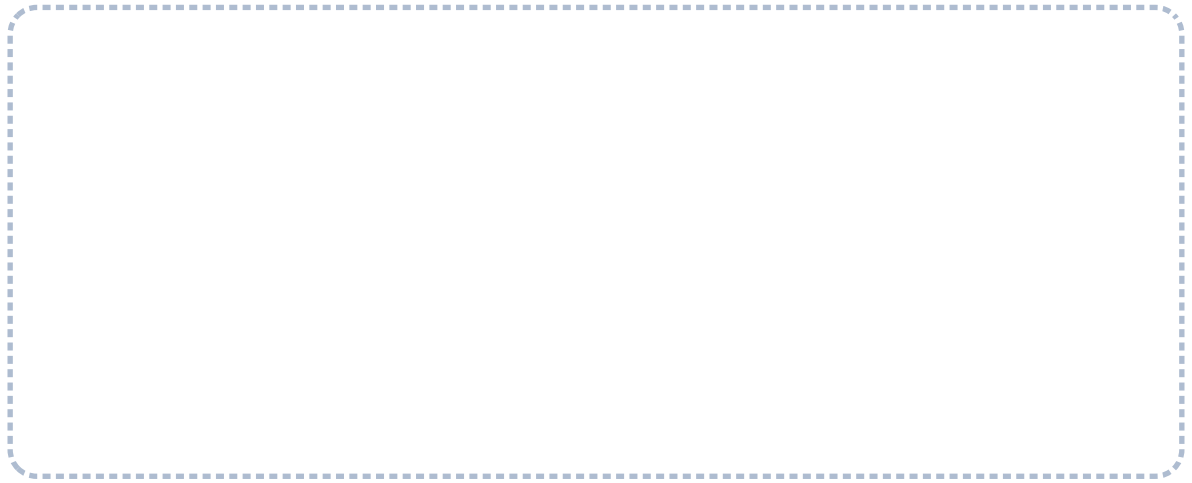
- (a) Use the graph to estimate the solutions of $2x^2 + 4x - 1 = 0$.
(b) Write down the coordinates of the turning point of the graph.



Q16

[3 marks]

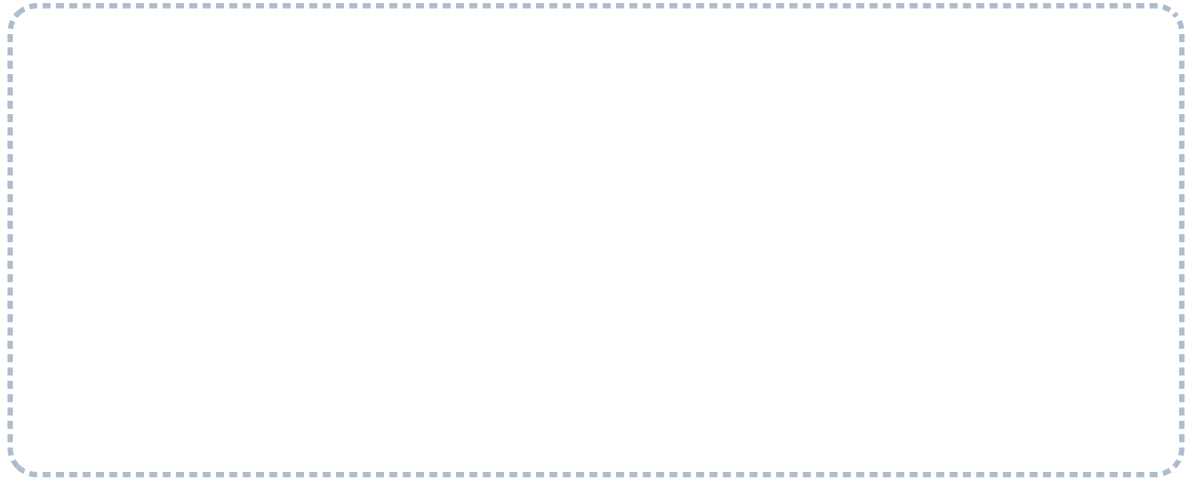
The graph of $y = x^2 + 13x + 42$ crosses the x -axis at two points. By factorising, find the coordinates of these two points.



Q17

[3 marks]

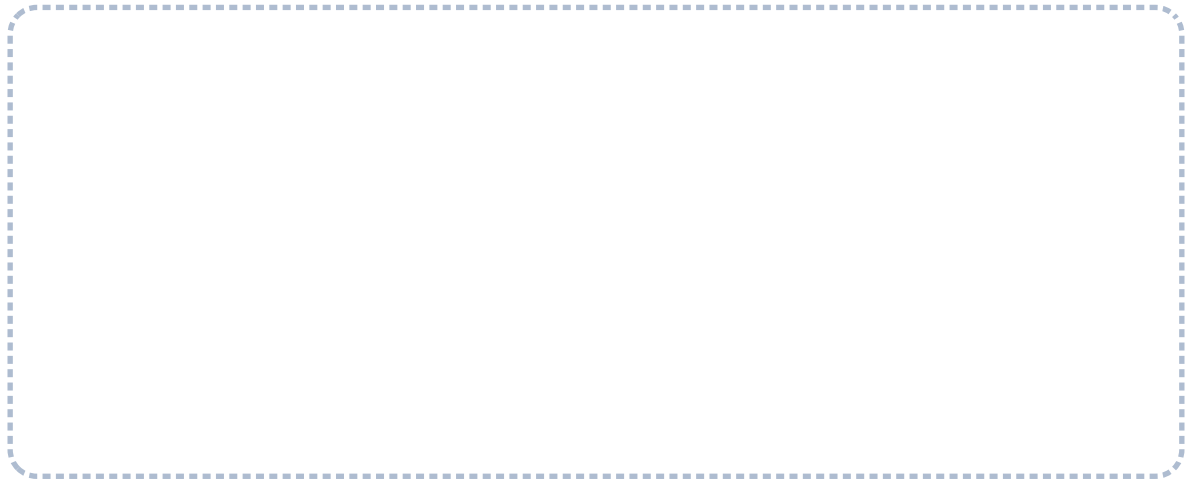
The graph of $y = x^2 - 4x - 21$ crosses the x -axis at two points. By factorising, find the coordinates of these two points.



Q18

[3 marks]

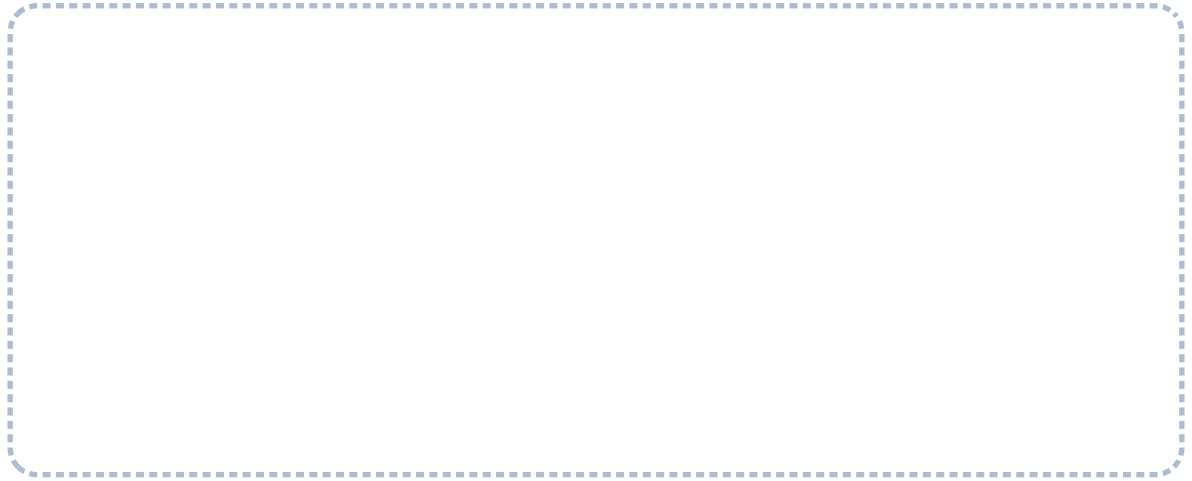
By completing the square, write $y = x^2 - 2x - 7$ in the form $(x + p)^2 + q$, and hence state the coordinates of the turning point of the graph of $y = x^2 - 2x - 7$.



Q19

[3 marks]

By completing the square, write $y = x^2 - 6x - 4$ in the form $(x + p)^2 + q$, and hence state the coordinates of the turning point of the graph of $y = x^2 - 6x - 4$.



Q20

[3 marks]

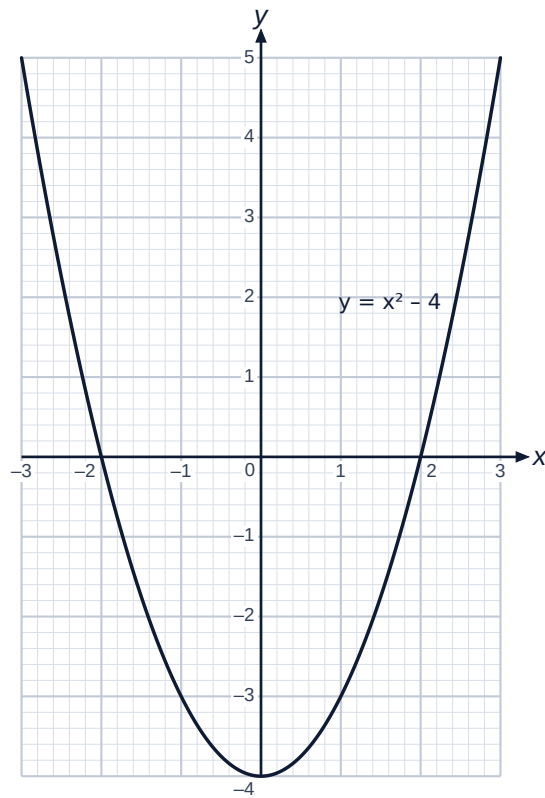
By completing the square, write $y = x^2 - 8x - 6$ in the form $(x + p)^2 + q$, and hence state the coordinates of the turning point of the graph of $y = x^2 - 8x - 6$.

Q21

[4 marks]

The graph of $y = x^2 - 4$ is drawn on the grid.

By drawing a suitable straight line on the grid, use the graph to find estimates for the solutions of $x^2 + x - 3 = 0$.

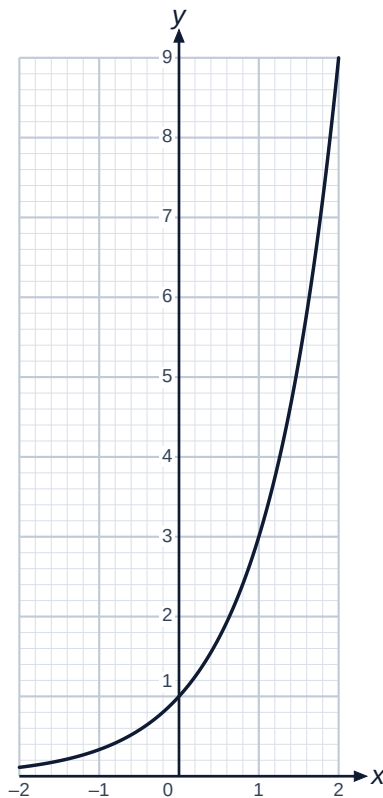


Q22

[3 marks]

The graph of $y = 3^x$ is drawn on the grid.

- (a) Write down the coordinates of the point where the graph crosses the y -axis.
- (b) Use the graph to estimate the value of y when $x = 1.5$.
- (c) Use the graph to estimate the solution of $3^x = 4$.

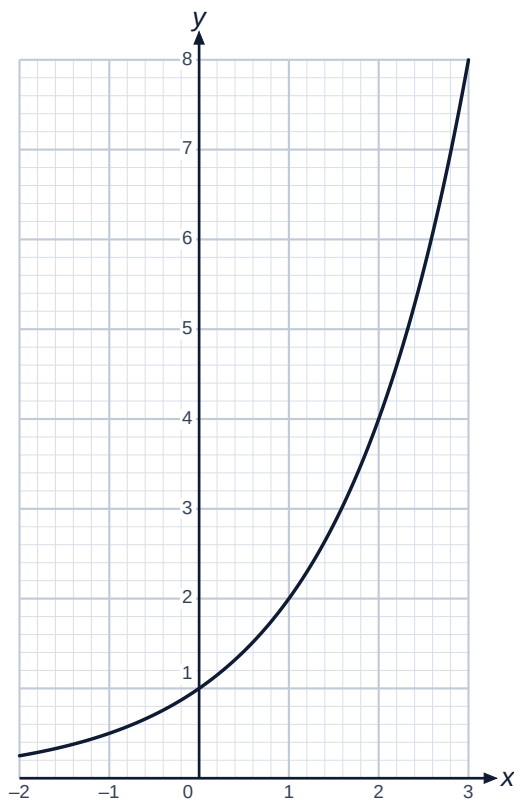


Q23

[3 marks]

The graph of $y = 2^x$ is drawn on the grid.

- (a) Write down the coordinates of the point where the graph crosses the y -axis.
- (b) Use the graph to estimate the value of y when $x = 1.5$.
- (c) Use the graph to estimate the solution of $2^x = 7$.

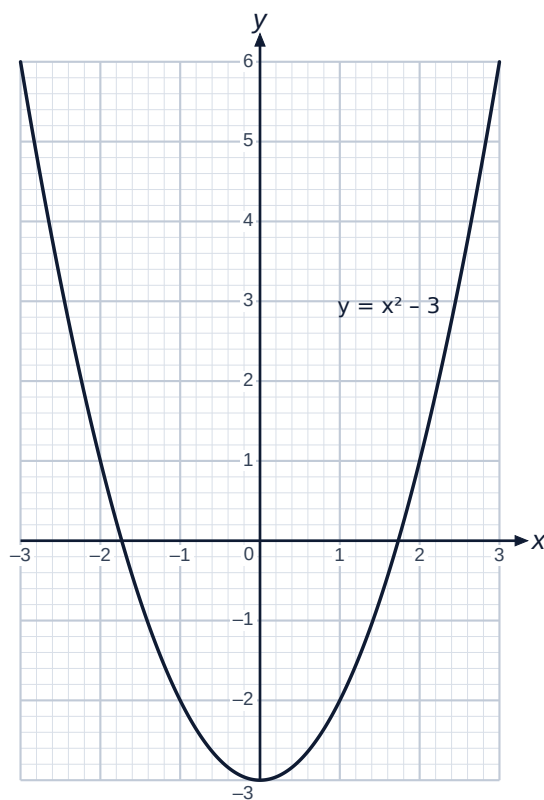


Q24

[4 marks]

The graph of $y = x^2 - 3$ is drawn on the grid.

By drawing a suitable straight line on the grid, use the graph to find estimates for the solutions of $x^2 - x - 1 = 0$.

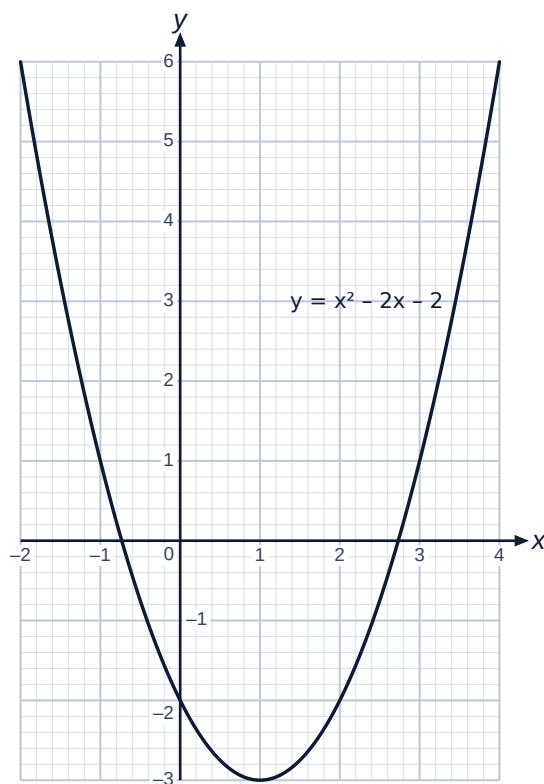


Q25

[4 marks]

The graph of $y = x^2 - 2x - 2$ is drawn on the grid.

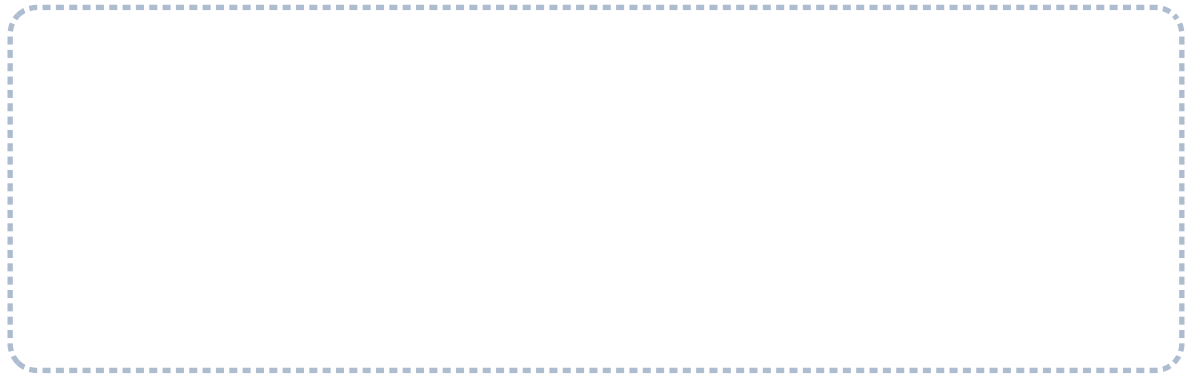
By drawing a suitable straight line on the grid, use the graph to find estimates for the solutions of $x^2 - x - 4 = 0$.



Q26

[2 marks]

The graph of $y = (x - 3)(x + 4)(x - 5)$ crosses the x -axis at three points. Write down the coordinates of these three points.

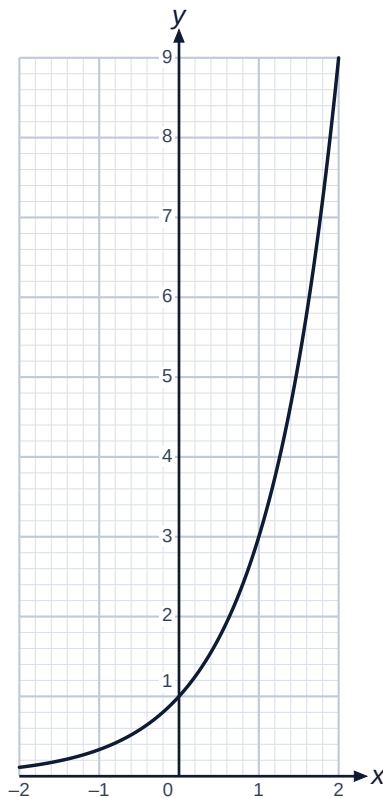


Q27

[3 marks]

The graph of $y = 3^x$ is drawn on the grid.

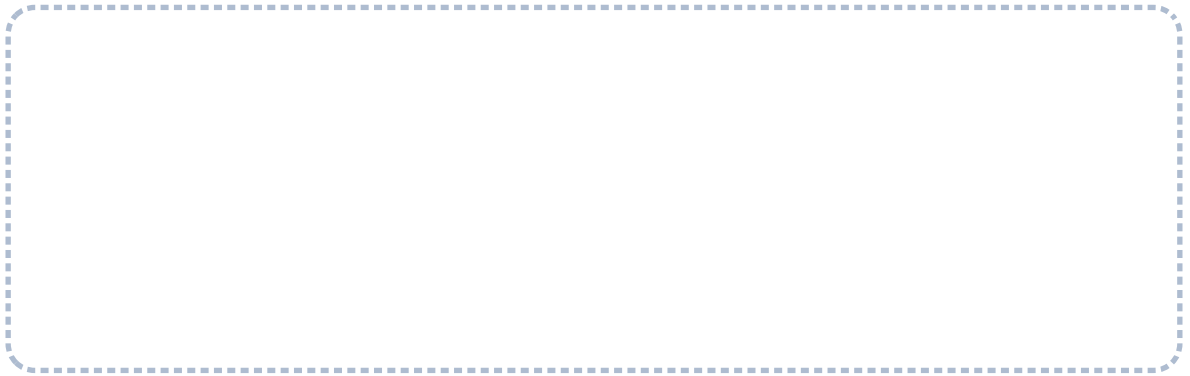
- (a) Write down the coordinates of the point where the graph crosses the y -axis.
- (b) Use the graph to estimate the value of y when $x = 1.5$.
- (c) Use the graph to estimate the solution of $3^x = 2$.



Q28

[2 marks]

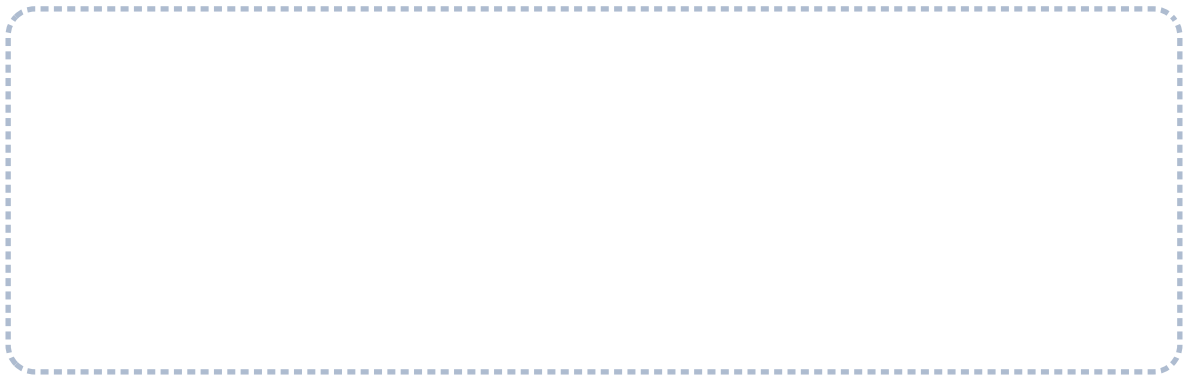
The graph of $y = (x + 3)(x + 4)(x - 5)$ crosses the x -axis at three points. Write down the coordinates of these three points.



Q29

[2 marks]

The graph of $y = (x + 5)(x + 1)(x - 4)$ crosses the x -axis at three points. Write down the coordinates of these three points.



Q30

[4 marks]

The graph of $y = x^2 + 2x - 3$ is drawn on the grid.

By drawing a suitable straight line on the grid, use the graph to find estimates for the solutions of $x^2 + 3x - 2 = 0$.

