

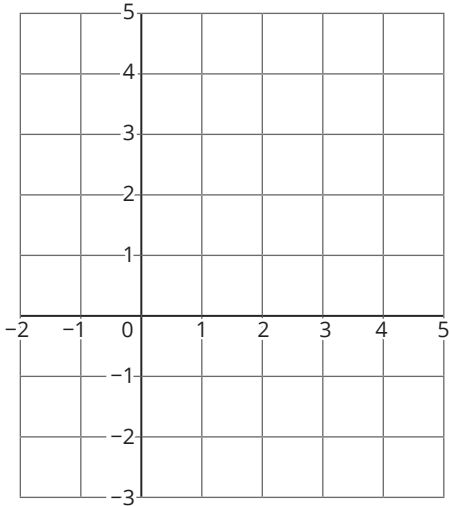


Graphs of Quadratic Equations

1. a. Complete the following table for the graph of $y = x^2 - 3x$

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

- b. Hence, plot the graph of $y = x^2 - 3x$ on the coordinate axes below.



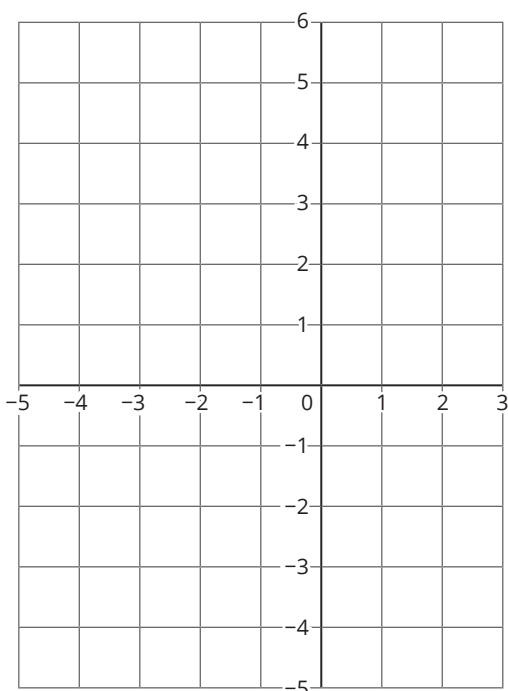
- c. Write down the solutions to $x^2 - 3x = 0$

- d. Use the graph to estimate the coordinates of the turning point of the graph $y = x^2 - 3x$

2. a. Complete the following table for the graph of $y = x^2 + 2x - 3$

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

- b. Hence, plot the graph of $y = x^2 + 2x - 3$ on the coordinate axes below.



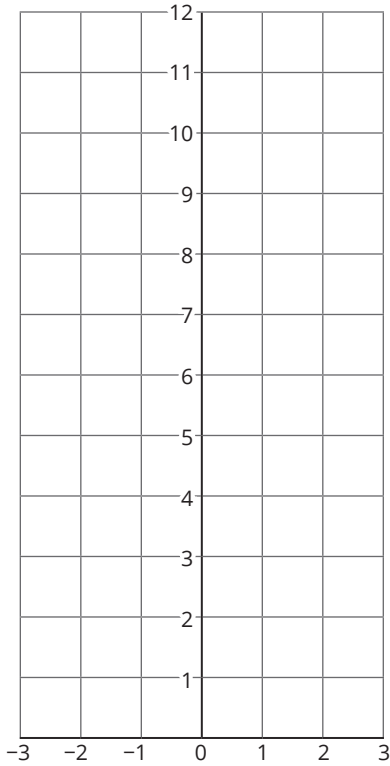
- c. Write down the solutions to $x^2 + 2x - 3 = 0$



3. a. Complete the following table for the graph of $y = 2x^2 + x + 1$

x	-2	-1	0	1	2
y					

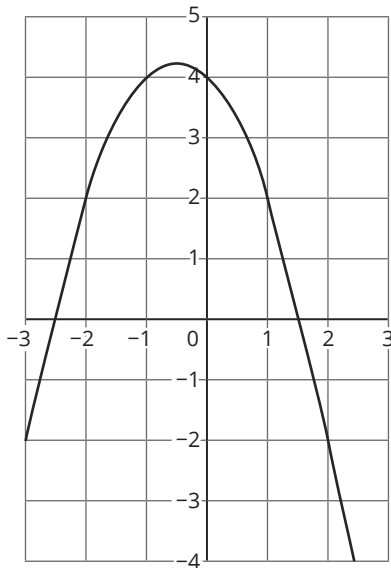
b. Hence, plot the graph of $y = 2x^2 + x + 1$ on the coordinate axes below.



c. By referring to your graph, explain why the equation $2x^2 + x + 1 = 0$ has no real solutions.

d. Estimate the solutions to $2x^2 + x + 1 = 3$

4. The diagram shows the graph of $y = 4 - x - x^2$

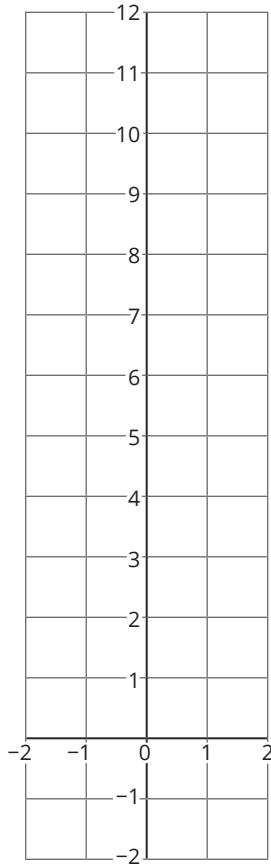


a. Draw the graph of $y = x + 2$ on the same set of coordinate axes.

b. Hence, find an estimate for the solutions to $4 - x - x^2 = x + 2$



5. The diagram shows the graph of $y = 3x^2 - 1$



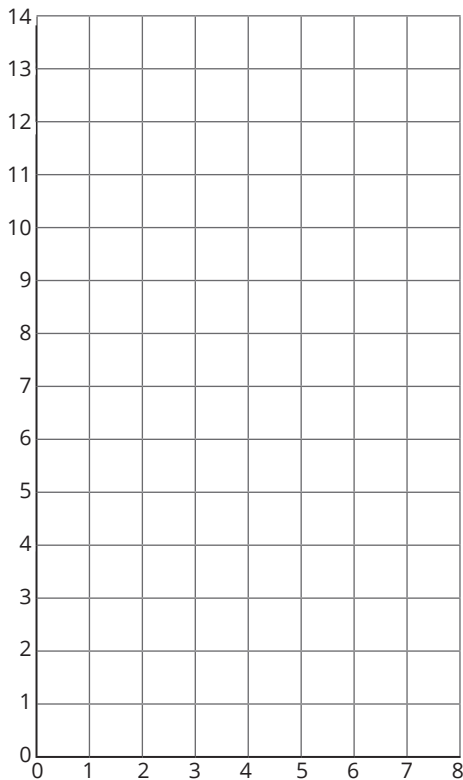
a. By drawing a suitable line on the graph, find estimates for the solution to the equation:

$$3x^2 - 1 = 2 - x$$

b. By drawing a second suitable line on the graph, find estimates for the solution to the equation:

$$3x^2 - x - 2 = 0$$

6. A ball is thrown from the top of a 10m-high building. The motion of the ball's height, h metres, after t seconds is modelled by the equation: $h = 10 + 2t - 0.5t^2$



a. Draw the motion of the ball for $0 \leq t \leq 7$

b. What was the maximum height reached by the ball?

c. How long after being thrown did the ball reach its maximum height?

d. Estimate how long it took for the ball to hit the ground.

e. Explain why we must restrict the domain of x to $0 \leq x < 7$

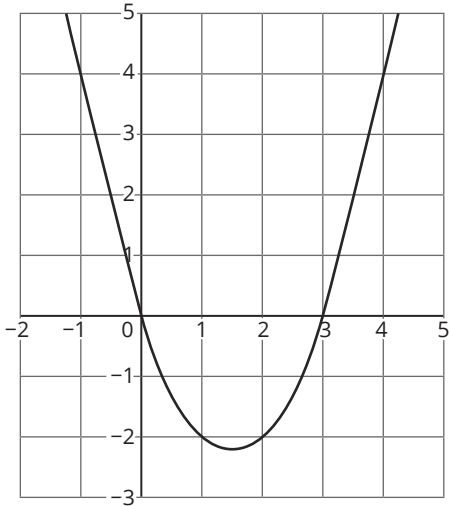


Graphs of Quadratic Equations **Answers**

1. a. Complete the following table for the graph of $y = x^2 - 3x$

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

- b. Hence, plot the graph of $y = x^2 - 3x$ on the coordinate axes below.



- c. Write down the solutions to $x^2 - 3x = 0$

$x = 0$ and $x = 3$

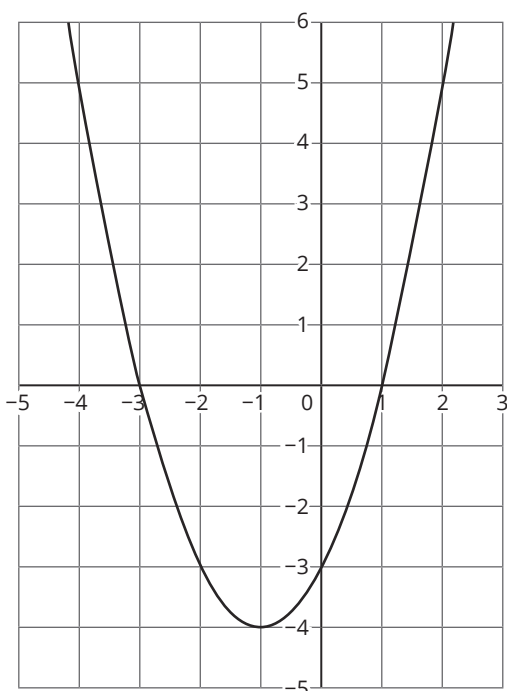
- d. Use the graph to estimate the coordinates of the turning point of the graph $y = x^2 - 3x$

(1.5, -2.25)

2. a. Complete the following table for the graph of $y = x^2 + 2x - 3$

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

- b. Hence, plot the graph of $y = x^2 + 2x - 3$ on the coordinate axes below.



- c. Write down the solutions to $x^2 + 2x - 3 = 0$

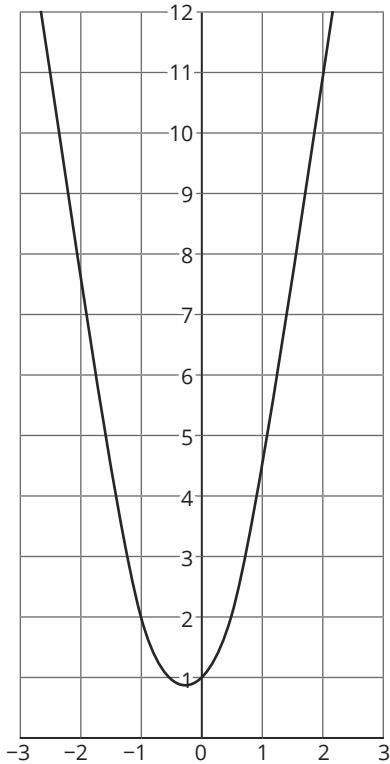
$x = -3$ and $x = 1$



3. a. Complete the following table for the graph of $y = 2x^2 + x + 1$

x	-2	-1	0	1	2
y	7	2	1	4	11

b. Hence, plot the graph of $y = 2x^2 + x + 1$ on the coordinate axes below.



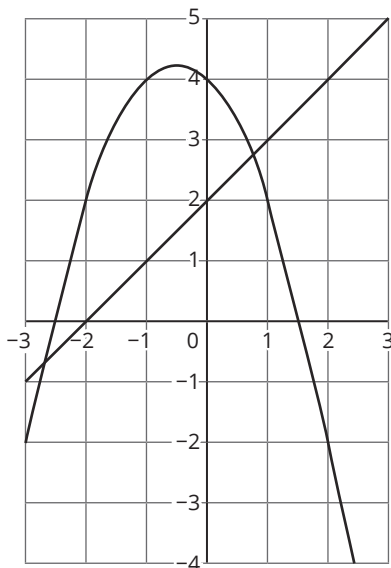
c. By referring to your graph, explain why the equation $2x^2 + x + 1 = 0$ has no real solutions.

The solutions to this equation are the values of the x -intercepts. This graph does not cross the x -axis so there are no real solutions to this equation.

d. Estimate the solutions to $2x^2 + x + 1 = 3$

$x = -1.25$ and $x = 0.75$

4. The diagram shows the graph of $y = 4 - x - x^2$

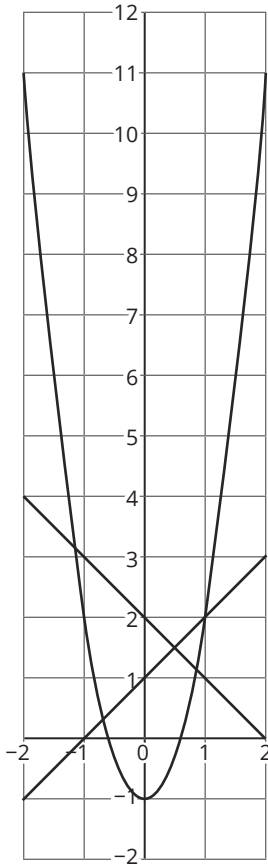


a. Draw the graph of $y = x + 2$ on the same set of coordinate axes.

b. Hence, find an estimate for the solutions to $4 - x - x^2 = x + 2$

$x = -2.75$ and $x = 0.75$

5. The diagram shows the graph of $y = 3x^2 - 1$



a. By drawing a suitable line on the graph, find estimates for the solution to the equation:

$$3x^2 - 1 = 2 - x$$

$$x = -1.2 \text{ and } x = 0.8$$

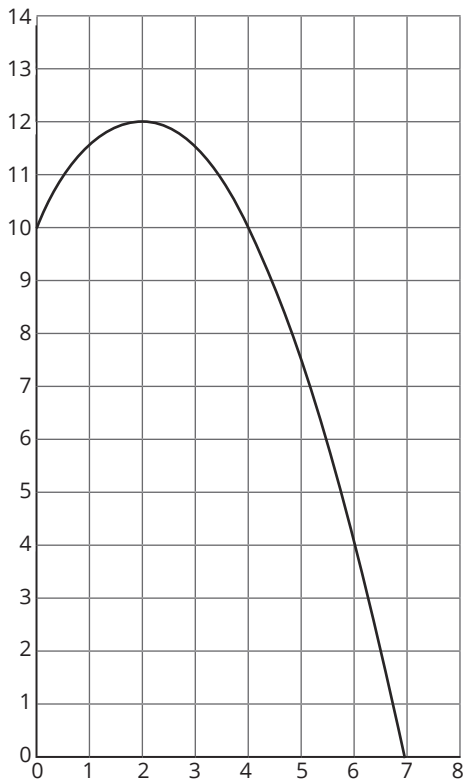
b. By drawing a second suitable line on the graph, find estimates for the solution to the equation:

$$3x^2 - x - 2 = 0$$

$$\text{Draw the line } y = x + 1$$

$$x = -0.7 \text{ and } x = 1$$

6. A ball is thrown from the top of a 10m-high building. The motion of the ball's height, h metres, after t seconds is modelled by the equation: $h = 10 + 2t - 0.5t^2$



a. Draw the motion of the ball for $0 \leq t \leq 7$

b. What was the maximum height reached by the ball?

12 metres

c. How long after being thrown did the ball reach its maximum height?

2 seconds

d. Estimate how long it took for the ball to hit the ground.

6.9 seconds

e. Explain why we must restrict the domain of x to $0 \leq x < 7$

The ball hits the ground at 6.9 seconds. Any results after this will have a negative height which is not possible within the context of this question.