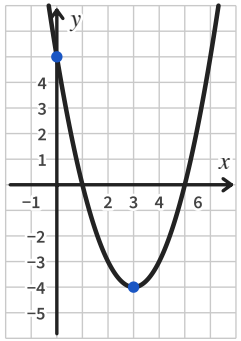
Roots and turning points

ANSWERS

1

The graph shows $y = x^2 - 6x + 5$.
Complete the facts.



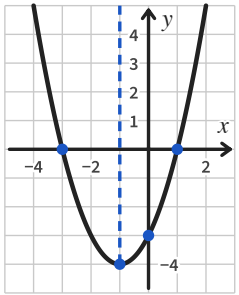
Roots x = 1 and x = 5

y intercept (0, 5)

Turning point (3, −4)

2

The graph shows $y = x^2 + 2x - 3$.
Complete the facts.



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

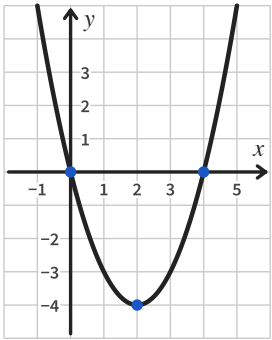
y intercept (0, −3)

Line of symmetry $x = -1$

Turning point (−1, −4)

3

The graph shows $y = x^2 - 4x$.
Complete the facts.



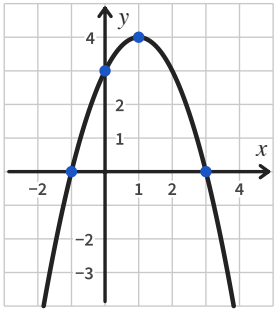
Roots $x = 0$ and $x = 4$

y intercept (0, 0)

Turning point (2, −4)

4 Notice the change!

The graph shows $y = -x^2 + 2x + 3$.
Complete the facts.



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

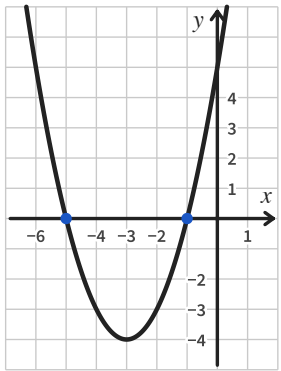
y intercept (0, 3)

Turning point (1, 4)

Maximum or minimum? maximum

5

The graph shows $y = x^2 + 6x + 5$. Use it to solve $x^2 + 6x + 5 = 0$.

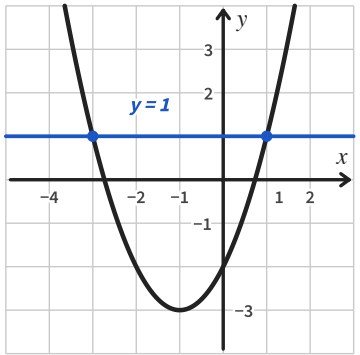


x = −5

or x = −1

6 Notice the change!

The graph shows $y = x^2 + 2x - 2$.
Draw the line $y = 1$ and use it to solve $x^2 + 2x - 2 = 1$.

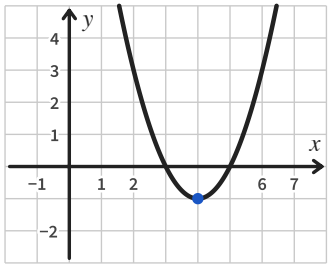


x = −3

or x = 1

7

Jade says the turning point of $y = x^2 - 8x + 15$ is (−1, 4).
Explain her mistake. Write down the turning point.

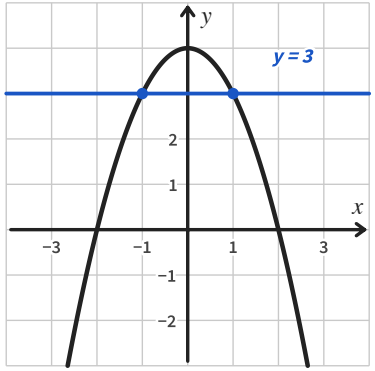


She wrote the coordinates the wrong way round: x first

Turning point (4, −1)

8

The graph shows $y = 4 - x^2$. Use it to solve $4 - x^2 = 3$.



x = −1

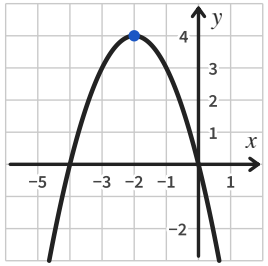
or x = 1

Roots and turning points *further practice*

ANSWERS

9

The graph shows $y = -x^2 - 4x$.
Write down the turning point. Is it a maximum or a minimum?



the highest point of the curve

x first: (−2, 4)

Answer *(−2, 4), maximum*

10

A quadratic curve crosses the x axis at $x = -2$ and $x = 6$. Write down the equation of its line of symmetry.

halfway between −2 and 6

(−2 + 6) ÷ 2 = 2

Answer *x = 2*

11

A U shaped curve has roots $x = 1$ and $x = 7$. Its lowest point is at $y = -9$.
Write down the coordinates of its turning point.

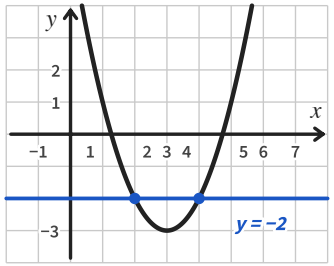
halfway between 1 and 7 is 4

x first: (4, −9)

Answer *(4, −9)*

12

The graph shows $y = x^2 - 6x + 6$.
Use it to solve $x^2 - 6x + 6 = -2$.



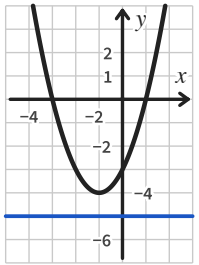
draw y = −2

it meets the curve at 2 and 4

Answer *x = 2 or x = 4*

13

The graph shows $y = x^2 + 2x - 3$.
Explain why $x^2 + 2x - 3 = -5$ has no solutions.



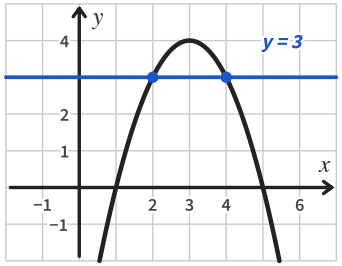
the lowest point is y = −4

so y = −5 never meets the curve

Answer *the line misses the curve*

14

The graph shows $y = -x^2 + 6x - 5$.
Use it to solve $-x^2 + 6x - 5 = 3$.



draw y = 3

it meets the curve at 2 and 4

Answer *x = 2 or x = 4*

15

A curve has its turning point at (−3, 5).
One root is $x = -7$. Find the other root.

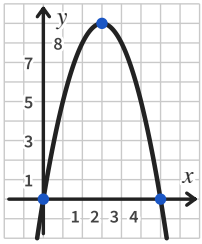
the line of symmetry is x = −3

−7 is 4 to the left, so 4 to the right: 1

Answer *x = 1*

16

A footbridge arch has the shape $y = -x^2 + 6x$, with x and y in metres.
How wide is the arch at ground level, and how high is it at the top?



roots 0 and 6: 6 m wide

turning point (3, 9): 9 m high

Answer *6 m wide, 9 m high*