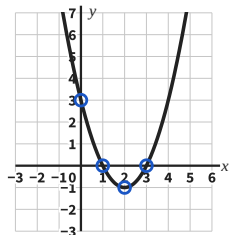


Quadratic Graphs: Roots and Turning Points

ANSWERS

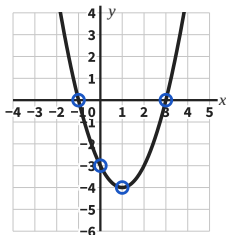
1 Roots are where it crosses the x axis.

Complete the facts for $y = x^2 - 4x + 3$.



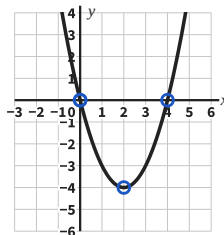
Roots $x = 1$ and $x = 3$
 y intercept $(0, 3)$
 Turning point $(2, -1)$

2 Complete the facts for $y = x^2 - 2x - 3$.



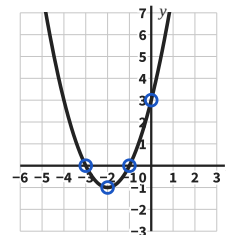
Roots $x = -1$ and $x = 3$
 y intercept $(0, -3)$
 Turning point $(1, -4)$

3 Complete the facts for $y = x^2 - 4x$.



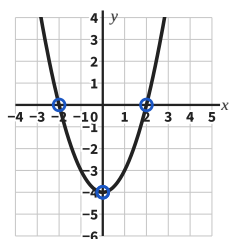
Roots $x = 0$ and $x = 4$
 y intercept $(0, 0)$
 Turning point $(2, -4)$

4 Complete the facts for $y = x^2 + 4x + 3$.



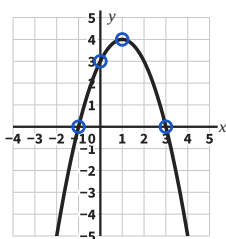
Roots $x = -3$ and $x = -1$
 y intercept $(0, 3)$
 Turning point $(-2, -1)$

5 Complete the facts for $y = x^2 - 4$.



Roots $x = -2$ and $x = 2$
 y intercept $(0, -4)$
 Turning point $(0, -4)$

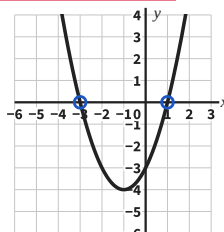
6 Complete the facts for $y = -x^2 + 2x + 3$.



Roots $x = -1$ and $x = 3$
 y intercept $(0, 3)$
 Turning point $(1, 4)$

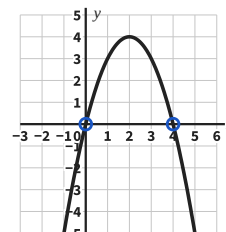
7 Notice the change!

The graph shows $y = x^2 + 2x - 3$.
 Use it to solve $x^2 + 2x - 3 = 0$.



$x = -3$ or $x = 1$

8 The graph shows $y = -x^2 + 4x$.
 Use it to solve $-x^2 + 4x = 0$.



$x = 0$ or $x = 4$

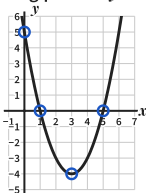
Quadratic Graphs: Roots and Turning Points

further practice

ANSWERS

9

Write down the roots, the y intercept and the turning point of $y = x^2 - 6x + 5$.



Roots $x = 1$ and $x = 5$
 y intercept $(0, 5)$
 Turning point $(3, -4)$

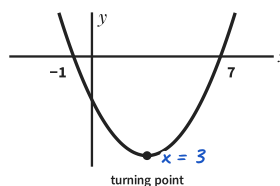
10

Without drawing the graph, find the y intercept and the roots of $y = x^2 - 16$.

$x^2 - 16 = 0$, so $x^2 = 16$
 y intercept $(0, -16)$
 Roots $x = -4$ and $x = 4$

11

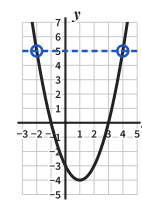
This quadratic graph crosses the x axis at $x = -1$ and $x = 7$. Find the x coordinate of its turning point.



Answer $x = 3$

12

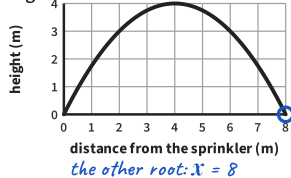
The graph shows $y = x^2 - 2x - 3$.
 Use it to solve $x^2 - 2x - 3 = 5$.



where the curve meets $y = 5$
 Answer $x = -2$ or $x = 4$

13

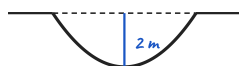
A garden sprinkler at ground level sends out a jet of water. The graph shows its path, $y = 2x - \frac{x^2}{4}$. How far from the sprinkler does the water hit the ground?



Answer 8 m

14

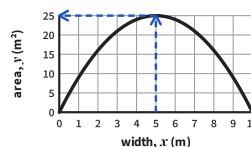
The side view of a skate ramp is the curve $y = \frac{x^2 - 8x}{8}$ between its edges at $x = 0$ and $x = 8$, in metres. How deep is the ramp?



lowest point halfway: $x = 4$
 $\frac{16 - 32}{8} = -2$
 Answer 2 m

15

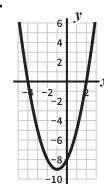
A rectangular flower bed has a perimeter of 20 m. Its width is x m and its area is y m², where $y = x(10 - x)$. Find the largest possible area, and the width that gives it.



Largest area 25 m²
 Width 5 m

16

The graph shows $y = x^2 + 2x - 8$. Explain why $x^2 + 2x - 8 = -10$ has no solutions.



the lowest point is $(-1, -9)$
 so y is never -10
 it never gets as low as -10
 Answer