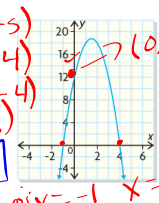


EXAMPLE 3 Determining the equation of a quadratic function, given its graph Nov. 6, 2013

Determine the function that defines this parabola. Write the function in standard form. Nov. 2, 2017


Handwritten notes:
 $y = a(x-r)(x-s)$
 $y = a(x+1)(x-4)$
 $12 = a(0+1)(0-4)$
 $12 = a(1)(-4)$
 $12 = -4a$
 $a = -3$
 $y = -3(x+1)(x-4)$
 $y = -3(x^2 - 3x - 4)$
 $y = -3x^2 + 9x + 12$



Indira's Solution

The x-intercepts are $x = -1$ and $x = 4$.
 The zeros of the function occur when x has values of -1 and 4 .
 $y = a(x - r)(x - s)$
 $y = a[x - (-1)](x - (4))$
 $y = a(x + 1)(x - 4)$

Thought bubbles:
 The graph is a parabola, so it is defined by a quadratic function.
 I located the x-intercepts and used them to determine the zeros of the function. I wrote the factored form of the quadratic function, substituting -1 and 4 for r and s .
 I knew that there are infinitely many quadratic functions that have these two zeros, depending on the value of a . I had to determine the value of a for the function that defines the blue graph.



The y-intercept is 12 .
 $y = a(x + 1)(x - 4)$
 $(12) = a[(0) + 1][(0) - 4]$
 $12 = a(1)(-4)$
 $12 = -4a$
 $-3 = a$

In factored form, the quadratic function is
 $y = -3(x + 1)(x - 4)$

In standard form, the quadratic function is
 $y = -3(x^2 - 3x - 4)$
 $y = -3x^2 + 9x + 12$

Thought bubbles:
 From the graph, I determined the coordinates of the y-intercept. Because these coordinates are integers, I decided to use the y-intercept to solve for a .
 I substituted the value of a into my equation.
 My equation seems reasonable, because it defines a graph with a y-intercept of 12 and a parabola that opens downward.

7.4 Page 8

Nov. 2, 2017

The zero's of a quadratic function are -6 & 12 . The graph of the function intersects the y-axis at -36 .

Handwritten notes:
 $y = a(x+6)(x-12)$
 $-36 = a(0+6)(0-12)$
 $(a)(r)(s) = y \text{ int.}$
 $(a)(6)(-12) = -36$
 $(-72) = -36$
 $\frac{-72}{-72} = \frac{-36}{-72}$
 $a = \frac{1}{2}$
 $-36 = a(1)(6)$
 $a = \frac{1}{2}$
 $y = \frac{1}{2}(x+6)(x-12)$
 (b) vertex $(3, -40.5)$
 AOS: $x = \frac{-6+12}{2}$
 $x = 3$
 $y = \frac{1}{2}(9)(-9)$
 $y = -40.5$
 D: $\{x \mid x \in \mathbb{R}\}$
 R: $\{y \mid y \geq -40.5, y \in \mathbb{R}\}$

Nov 1-10:41 AM

Attachments

7s4e1 final.mp4

7s4e2 final.mp4

7s4e3 final.mp4

7s4e4 final.mp4

fm7s4-p11.tns

FM11-7s4.gsp