LESSON MAKER PRO

Find the Zeros

Choose a useful way to solve each quadratic equation.

HIGH SCHOOL · MT.CORE.ALG.QUAD.4

MT.CORE.ALG.QUAD.4 "Solve quadratic equations by factoring, graphing, completing the square, using inverse operations, and the quadratic formula. Use technology and representations strategically."

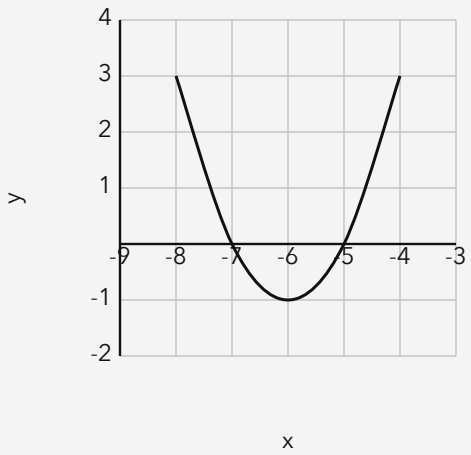
NAME _____ DATE _____

GRAPHS AND EQUATIONS

The solutions to a quadratic equation are the x-values where its graph crosses or touches the x-axis. When no graph is given, choose an efficient method: factor, undo a square, complete the square, or use the quadratic formula.

WORKED EXAMPLE

Use the graph to solve y = 0.

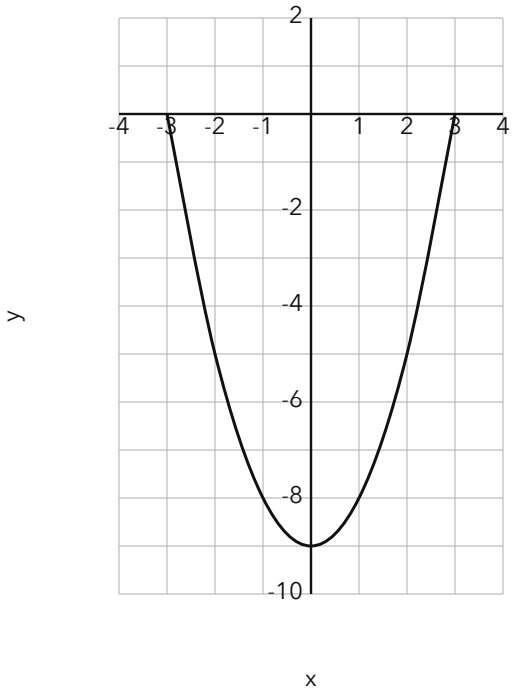


1. Find where the curve meets the x-axis.
2. Read the x-values at those points: -7 and -5.
3. At both points, y = 0.

Answer: x = -7 or x = -5

PRACTICE 6 problems

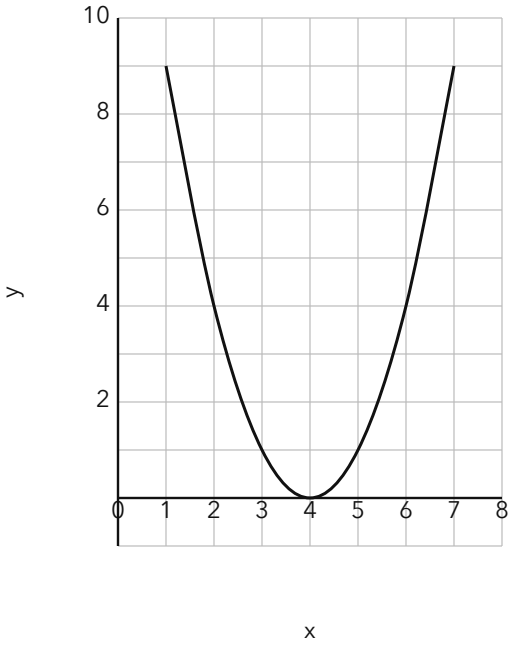
1 Use the graph to solve y = 0.



ANSWER _____

_____

2 Use the graph to solve y = 0. How many distinct solutions are there?



ANSWER _____

_____

3 Solve $x^2 + x - 12 = 0$ by factoring.

ANSWER _____

_____

4 Solve $(x - 1)^2 = 16$ by undoing the square.

ANSWER _____

_____

5 Solve $x^2 + 6x + 1 = 0$ by completing the square.

ANSWER _____

_____

6 Solve $2x^2 + 3x - 1 = 0$ using the quadratic formula.

ANSWER _____

_____

APPLY IT Show your work

1 A basketball is released 9 feet above the gym floor. Its height h(t), in feet, after t seconds is $h(t) = -16t^2 + 32t + 9$. When does the ball hit the floor?

WORK SPACE

ANSWER _____

2 A dance committee models its profit P(x), in dollars, as $P(x) = -10x^2 + 120x - 200$. Here, x is the number of groups of 10 tickets sold. How many tickets could the committee sell to break even?

WORK SPACE

ANSWER _____

CHALLENGE One step up

Does $3x^2 + 6x + 5 = 0$ have any real solutions? Explain without using the quadratic formula.

WORK SPACE AND ANSWER

Find the Zeros

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Use the graph to solve y = 0.	**x = -3 or x = 3**
2	Use the graph to solve y = 0. How many distinct solutions are there?	**x = 4; one distinct solution**
3	Solve $x^2 + x - 12 = 0$ by factoring.	**x = -4 or x = 3**
4	Solve $(x - 1)^2 = 16$ by undoing the square.	**x = -3 or x = 5**
5	Solve $x^2 + 6x + 1 = 0$ by completing the square.	**x = -3 + 2sqrt(2) or x = -3 - 2sqrt(2)**
6	Solve $2x^2 + 3x - 1 = 0$ using the quadratic formula.	**x = (-3 + sqrt(17))/4 or x = (-3 - sqrt(17))/4**

PART 2 · APPLY IT

1. **9/4 seconds after release** Set h(t) = 0 and factor: -(4t + 1)(4t - 9) = 0. The solutions are -1/4 and 9/4; only the positive time is after release.
2. **20 tickets or 100 tickets** Set P(x) = 0 and divide by -10 to get $x^2 - 12x + 20 = 0$. Factoring gives x = 2 or x = 10 groups of 10 tickets.

CHALLENGE

No. The equation becomes $3(x + 1)^2 + 2 = 0$, but $3(x + 1)^2 + 2$ is always at least 2 for real x.

Accept solutions in either order and equivalent exact forms. In the challenge, also accept a correct discriminant argument.