LESSON MAKER PRO

Quadratic Paths

Find every real solution.

GRADE 8 · 8A.AF.D.11.b

8A.AF.D.11.b "Solve quadratic equations by inspection (such as $x^2 = 49$), taking square roots, completing the square, the quadratic formula, and factoring, as appropriate to the initial form of the equation..."

NAME _____ DATE _____

CHOOSE A METHOD

If a quadratic equation can be factored, set each factor equal to 0. If a squared expression equals a number, take both the positive and negative square roots. A squared real number cannot equal a negative number.

WORKED EXAMPLE

Solve $x^2 - 11x + 30 = 0$.

1. Factor: $(x - 5)(x - 6) = 0$.
2. Set each factor equal to 0: $x - 5 = 0$ or $x - 6 = 0$.
3. Solve each equation: $x = 5$ or $x = 6$.

Answer: x = 5 or x = 6

PRACTICE 6 problems

1 Solve $x^2 = 64$.

ANSWER _____

2 Solve $(x - 3)^2 = 16$.

ANSWER _____

3 Solve $x^2 - 9x + 14 = 0$.

ANSWER _____

4 Solve $x^2 + x - 12 = 0$.

ANSWER _____

5 Does $x^2 = -25$ have any real solutions? Explain briefly.

ANSWER _____

6 Solve $3x^2 - 27 = 0$.

ANSWER _____

APPLY IT Show your work

1 A character jumps from a ledge in a video game. Its height above the ground, in meters, is $-x^2 + 8x + 9$ after x seconds. At what times is the character 9 meters above the ground?

WORK SPACE

ANSWER _____

2 A square tile in a pixel art design contains 144 pixels. How many pixels long is each side?

WORK SPACE

ANSWER _____

CHALLENGE One step up

Solve $x^2 + 8x + 3 = 0$ by completing the square. Show how you get both solutions.

WORK SPACE AND ANSWER

ANSWER KEY # Quadratic Paths

GRADE 8 · 8A.AF.D.11.b

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Solve $x^2 = 64$.	**x = -8 or x = 8**
2	Solve $(x - 3)^2 = 16$.	**x = -1 or x = 7**
3	Solve $x^2 - 9x + 14 = 0$.	**x = 2 or x = 7**
4	Solve $x^2 + x - 12 = 0$.	**x = -4 or x = 3**
5	Does $x^2 = -25$ have any real solutions? Explain briefly.	**No. The square of a real number cannot be negative.**
6	Solve $3x^2 - 27 = 0$.	**x = -3 or x = 3**

PART 2 · APPLY IT

1. **At 0 seconds and 8 seconds.** Set $-x^2 + 8x + 9 = 9$ and factor to get $x(8 - x) = 0$. The character is at that height when $x = 0$ or $x = 8$.
2. **12 pixels** Let x be the number of pixels on each side. Since $x^2 = 144$ and a side length is positive, $x = 12$.

CHALLENGE

$x^2 + 8x = -3$; $(x + 4)^2 = 13$; $x = -4 + \sqrt{13}$ or $x = -4 - \sqrt{13}$.

Accept the two solutions in either order. For the challenge, accept $x = -4 \pm \sqrt{13}$.