

Quadratic Breakout

Use factoring, square roots, and the quadratic formula to find every solution.

HIGH SCHOOL • AI-A.REI.4

AI-A.REI.4 "Solve quadratic equations in one variable."

NAME _____

DATE _____

SOLVE TO ZERO

First, write the equation so one side equals 0. Factor when you can, then set each factor equal to 0. If factoring does not work, use square roots, completing the square, or the quadratic formula.

WORKED EXAMPLE

$$\text{Solve } x^2 - 11x + 24 = 0.$$

1. Factor: $(x - 3)(x - 8) = 0$.
2. Set each factor equal to 0: $x - 3 = 0$ or $x - 8 = 0$.
3. Solve: $x = 3$ or $x = 8$.

Answer: $x = 3$ or $x = 8$

PRACTICE 6 problems

1 Solve $x^2 - 5x + 4 = 0$.

ANSWER _____

2 Solve $x^2 + 6x + 5 = 0$.

ANSWER _____

3 Solve $4x^2 - 4x - 3 = 0$.

ANSWER _____

4 Solve $x^2 = 36$.

ANSWER _____

5 Solve $x^2 + 4 = 0$.

ANSWER _____

6 Solve $x^2 - 2x - 1 = 0$.

ANSWER _____

APPLY IT Show your work

- 1** The height, in meters, of a camera drone after x seconds is $-5x^2 + 20x + 25$. At what positive time will the drone reach the ground?

WORK SPACE

ANSWER _____

- 2** A student club is making a rectangular photo backdrop. Its width is x feet, its length is $x + 5$ feet, and its area is 84 square feet. What are the dimensions of the backdrop?

WORK SPACE

ANSWER _____

CHALLENGE One step up

What number must replace the box so that $x^2 - 10x + \square = 0$ has exactly one solution? Then find the solution and explain why there is only one.

WORK SPACE AND ANSWER

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Solve $x^2 - 5x + 4 = 0$.	$x = 1$ or $x = 4$
2	Solve $x^2 + 6x + 5 = 0$.	$x = -1$ or $x = -5$
3	Solve $4x^2 - 4x - 3 = 0$.	$x = 3/2$ or $x = -1/2$
4	Solve $x^2 = 36$.	$x = 6$ or $x = -6$
5	Solve $x^2 + 4 = 0$.	$x = 2i$ or $x = -2i$
6	Solve $x^2 - 2x - 1 = 0$.	$x = 1 + \sqrt{2}$ or $x = 1 - \sqrt{2}$

PART 2 • APPLY IT

- x = 5 seconds** Set the height expression equal to 0: $-5x^2 + 20x + 25 = 0$. The solutions are $x = -1$ and $x = 5$, so the positive time is 5 seconds.
- 7 feet by 12 feet** Write $x(x + 5) = 84$, then solve $x^2 + 5x - 84 = 0$. The positive solution is $x = 7$, so the length is 12 feet.

CHALLENGE

Replace the box with 25. The equation becomes $(x - 5)(x - 5) = 0$, so $x = 5$. There is only one solution because the two factors are the same.

Accept solutions in any order. For the complex-number problem, accept $x = \pm 2i$, and for the quadratic-formula problem, accept $x = 1 \pm \sqrt{2}$.