

Quadratic Quest

Find every solution, using the strategy that fits.

HIGH SCHOOL • HSA-REI.B.4

CCSS.Math.Content.HSA-REI.B.4 "Solve quadratic equations in one variable."

NAME _____

DATE _____

CHOOSE A STRATEGY

First write the equation with 0 on one side. Then use factoring, square roots, completing the square, or the quadratic formula to find every value of x that makes the equation true.

WORKED EXAMPLE

Solve $x^2 - 11x + 28 = 0$.

1. Factor: $(x - 4)(x - 7) = 0$.
2. Set each factor equal to 0: $x - 4 = 0$ or $x - 7 = 0$.
3. Solve: $x = 4$ or $x = 7$.

Answer: $x = 4$ or $x = 7$

PRACTICE 6 problems

1 Solve $x^2 - 15x + 54 = 0$.

ANSWER _____

2 Solve $x^2 + 12x + 27 = 0$.

ANSWER _____

3 Solve $3x^2 - 18x = 0$.

ANSWER _____

4 Solve $x^2 - x - 30 = 0$.

ANSWER _____

5 Solve $x^2 = 81$.

ANSWER _____

6 Solve $x^2 + 2x - 14 = 0$.

ANSWER _____

APPLY IT Show your work

- 1** A student launches a water rocket from the ground. Its height h , in meters, is $h = -6t^2 + 30t$, where t is time in seconds. At what times is the rocket on the ground?

WORK SPACE

ANSWER _____

- 2** A student is making a rectangular wall poster for a gaming setup. The poster's width is x centimeters and its length is $x + 9$ centimeters. If its area is 90 square centimeters, what are the poster's dimensions?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Solve $x^2 - 6x + 13 = 0$. Explain in one sentence why the solutions are not real.

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Solve $x^2 - 15x + 54 = 0$.	$x = 6$ or $x = 9$
2	Solve $x^2 + 12x + 27 = 0$.	$x = -3$ or $x = -9$
3	Solve $3x^2 - 18x = 0$.	$x = 0$ or $x = 6$
4	Solve $x^2 - x - 30 = 0$.	$x = 6$ or $x = -5$
5	Solve $x^2 = 81$.	$x = -9$ or $x = 9$
6	Solve $x^2 + 2x - 14 = 0$.	$x = -1 + \sqrt{15}$ or $x = -1 - \sqrt{15}$

PART 2 · APPLY IT

- $t = 0$ seconds or $t = 5$ seconds** Set h equal to 0: $-6t^2 + 30t = 0$. Factor $-6t(t - 5) = 0$, so $t = 0$ or $t = 5$.
- Width = 6 cm, length = 15 cm** Write $x(x + 9) = 90$, then $x^2 + 9x - 90 = 0$. Factor $(x + 15)(x - 6) = 0$ and reject $x = -15$ because a length cannot be negative.

CHALLENGE

$x = 3 + 2i$ or $x = 3 - 2i$; completing the square gives $(x - 3)^2 = -4$, which has no real square root.

Accept solution sets in any order and equivalent work using factoring, square roots, completing the square, or the quadratic formula. For the poster, accept only the positive dimensions, and for the challenge, accept $3 \pm 2i$.