

Zero In Quadratics

Factor quadratic equations to find real solutions.

HIGH SCHOOL • MA.912.AR.3.1

MA.912.AR.3.1 "Given a mathematical or real-world context, write and solve one-variable quadratic equations over the real number system."

NAME _____

DATE _____

FACTOR TO FIND ZEROS

To solve a quadratic by factoring, first write the equation with 0 on one side. Factor the quadratic, then set each factor equal to 0 because if a product is 0, at least one factor must be 0.

WORKED EXAMPLE

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

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

Answer: $x = 2$ or $x = 7$

PRACTICE 6 problems

1 Solve $x^2 - 11x + 24 = 0$.

ANSWER _____

2 Solve $x^2 + 5x - 24 = 0$.

ANSWER _____

3 Solve $3x^2 - 15x = 0$.

ANSWER _____

4 Solve $x^2 = 36$.

ANSWER _____

5 Solve $x^2 - 13x + 40 = 0$.

ANSWER _____

6 Solve $x^2 + 10x + 25 = 0$.

ANSWER _____

APPLY IT Show your work

- 1** A rectangular gaming desk mat has an area of 96 square inches. Its length is 4 inches greater than its width x . Write and solve a quadratic equation to find the dimensions.

WORK SPACE

ANSWER _____

- 2** A soccer ball is kicked upward from the ground. Its height h , in meters, after t seconds is $h = -5t^2 + 30t$. Write and solve a quadratic equation to find when the ball is on the ground. Give the time after the kick when it returns to the ground.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Solve $15x^2 + 4x - 3 = 0$. Show the factors you use.

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Solve $x^2 - 11x + 24 = 0$.	$x = 3$ or $x = 8$
2	Solve $x^2 + 5x - 24 = 0$.	$x = 3$ or $x = -8$
3	Solve $3x^2 - 15x = 0$.	$x = 0$ or $x = 5$
4	Solve $x^2 = 36$.	$x = 6$ or $x = -6$
5	Solve $x^2 - 13x + 40 = 0$.	$x = 5$ or $x = 8$
6	Solve $x^2 + 10x + 25 = 0$.	$x = -5$

PART 2 · APPLY IT

- $x^2 + 4x - 96 = 0$; width = 8 inches and length = 12 inches** Let the width be x and the length be $x + 4$. Then $x(x + 4) = 96$, so $x^2 + 4x - 96 = 0 = (x + 12)(x - 8)$; reject the negative dimension.
- $-5t^2 + 30t = 0$; $t = 0$ or $t = 6$, so the ball returns to the ground after 6 seconds** Set h equal to 0: $-5t^2 + 30t = 0$. Factor to get $-5t(t - 6) = 0$, where $t = 0$ is the kick and $t = 6$ is the return time.

CHALLENGE

$(3x - 1)(5x + 3) = 0$; $x = 1/3$ or $x = -3/5$

Accept equivalent factored forms and solutions in either order. For context problems, students should reject negative dimensions and identify the later time as the return time.