LESSON MAKER PRO

Check the Candidate

Solve first, then test each possible answer.

HIGH SCHOOL · A1P.AF.B

A1P.AF.B "Finding solutions to an equation, inequality, or system of equations or inequalities requires the checking of candidate solutions, whether generated analytically or graphically..."

NAME _____ DATE _____

WHY CHECK?

Squaring both sides can create a candidate that does not satisfy the original equation. Multiplying by an expression with x can hide a zero denominator. Substitute every candidate into the original equation, and check any other conditions.

WORKED EXAMPLE

Solve sqrt(x + 63) = x - 9. Check both candidates.

1. Square both sides: $x + 63 = (x - 9)^2$.
2. Rearrange and factor: $x^2 - 19x + 18 = (x - 18)(x - 1) = 0$.
3. Check x = 18: sqrt(81) = 9 and 18 - 9 = 9.
4. Check x = 1: sqrt(64) = 8, but 1 - 9 = -8.

Answer: x = 18. The candidate x = 1 is extraneous.

PRACTICE 6 problems

1 Check x = 3 and x = 0 in sqrt(x + 1) = x - 1. Which candidate is a solution? Show your checks.

ANSWER _____

2 Check x = 5 and x = 2 in sqrt(x - 1) = x - 3. Which candidate is a solution? Show your checks.

ANSWER _____

3 Solve sqrt(x + 2) = x - 4. Check each candidate.

ANSWER _____

4 Solve sqrt(x + 3) = x - 3. Check each candidate.

ANSWER _____

5 Solve sqrt(2x + 1) = x - 1. Check each candidate.

ANSWER _____

6 Solve $(x^2 - 9)/(x - 3) = 6$. Check your candidate in the original equation.

ANSWER _____

APPLY IT Show your work

1 A square sticker has an area of x + 8 square centimeters. Each side is x - 4 centimeters long. Find x. Check every candidate against the sticker's dimensions.

WORK SPACE

ANSWER _____

2 A skateboard ramp forms a right triangle. Its horizontal run is x feet, its height is 6 feet, and its sloped length is x + 2 feet. Find x, then check that all three lengths form a right triangle.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Find every x that satisfies both sqrt(x + 4) = x - 2 and x < 4. Explain what happens to each candidate you get by squaring.

WORK SPACE AND ANSWER

Check the Candidate

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Check x = 3 and x = 0 in sqrt(x + 1) = x - 1. Which candidate is a solution? Show your checks.	**x = 3. At x = 3, both sides equal 2. At x = 0, the sides are 1 and -1.**
2	Check x = 5 and x = 2 in sqrt(x - 1) = x - 3. Which candidate is a solution? Show your checks.	**x = 5. At x = 5, both sides equal 2. At x = 2, the sides are 1 and -1.**
3	Solve sqrt(x + 2) = x - 4. Check each candidate.	**x = 7. Squaring gives (x - 7)(x - 2) = 0. At x = 7, both sides equal 3. At x = 2, the sides are 2 and -2.**
4	Solve sqrt(x + 3) = x - 3. Check each candidate.	**x = 6. Squaring gives (x - 6)(x - 1) = 0. At x = 6, both sides equal 3. At x = 1, the sides are 2 and -2.**
5	Solve sqrt(2x + 1) = x - 1. Check each candidate.	**x = 4. Squaring gives x(x - 4) = 0. At x = 4, both sides equal 3. At x = 0, the sides are 1 and -1.**
6	Solve $(x^2 - 9)/(x - 3) = 6$. Check your candidate in the original equation.	**No solution. Multiplying by x - 3 gives $(x - 3)^2 = 0$, but x = 3 makes the original denominator zero.**

PART 2 · APPLY IT

1. **x = 8. The sticker has an area of 16 square centimeters and a side length of 4 centimeters.** Set sqrt(x + 8) = x - 4. Squaring gives candidates x = 8 and x = 1; x = 1 would give a negative side length and does not satisfy the original equation.
2. **x = 8 feet. The lengths are 8, 6, and 10 feet.** Set $\sqrt{x^2 + 36} = x + 2$ and square both sides to get x = 8. Check: $8^2 + 6^2 = 10^2$, and all lengths are positive.

CHALLENGE

No solution. Squaring gives x = 5 or x = 0. The candidate x = 5 satisfies the equation but not x < 4. The candidate x = 0 satisfies x < 4 but not the original equation, since 2 does not equal -2.

Accept checks shown by substitution rather than written explanations. For the rational equation, x = 3 is excluded because division by zero is undefined.