LESSON MAKER PRO

Check the Candidates

Solve radical equations, then test what you found.

HIGH SCHOOL · A2S.AF.B

A2S.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 of an equation can produce a candidate that does not satisfy the original equation. Substitute every candidate into the original equation, not the squared equation. Keep only the values that make the original equation true.

WORKED EXAMPLE

Solve sqrt(x + 6) = x - 6.

1. Square both sides: $x + 6 = (x - 6)^2$.
2. Simplify and factor: $x^2 - 13x + 30 = (x - 10)(x - 3) = 0$.
3. Check x = 10: sqrt(16) = 10 - 6, so 4 = 4.
4. Check x = 3: sqrt(9) does not equal 3 - 6, so reject 3.

Answer: x = 10

PRACTICE 6 problems

1 Solve sqrt(x + 5) = x - 1. Check your candidates before choosing an answer.

ANSWER _____

2 A classmate squared sqrt(x + 4) = x - 2 and found candidates x = 0 and x = 5. Which candidate works? Show a check for the one you reject.

ANSWER _____

3 Solve sqrt(x + 17) = x - 3. Check your candidates before choosing an answer.

ANSWER _____

4 The candidates for sqrt(x + 16) = x - 4 are x = 0 and x = 9. Which one satisfies the original equation? Show a check for the one you keep.

ANSWER _____

5 The candidates for sqrt(2x + 34) = x + 5 are x = 1 and x = -9. Which one works? Explain why the other is extraneous.

ANSWER _____

6 Solve sqrt(x + 15) = x + 3. Check your candidates before choosing an answer.

ANSWER _____

APPLY IT Show your work

1 A gaming club sets up a rectangular projection screen. It is 8 feet tall, x feet wide, and 10 feet across the diagonal. Use $x^2 + 8^2 = 10^2$ to find the width. Check that your answer makes sense for a width.

WORK SPACE

ANSWER _____

2 A streamer runs a cable from a desk to a wall connection 5 feet higher. The horizontal distance is x feet, and the cable is x + 1 feet long. Use sqrt(x^2 + 25) = x + 1 to find the horizontal distance. Check your answer in the original equation.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Solve sqrt(x + 7) + sqrt(x - 5) = 6. Show how you isolate and square a radical, then check your answer in the original equation.

WORK SPACE AND ANSWER

ANSWER KEY

Check the Candidates

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Solve sqrt(x + 5) = x - 1. Check your candidates before choosing an answer.	**x = 4**
2	A classmate squared sqrt(x + 4) = x - 2 and found candidates x = 0 and x = 5. Which candidate works? Show a check for the one you reject.	**x = 5 works. Reject x = 0 because sqrt(4) = 2, but 0 - 2 = -2.**
3	Solve sqrt(x + 17) = x - 3. Check your candidates before choosing an answer.	**x = 8**
4	The candidates for sqrt(x + 16) = x - 4 are x = 0 and x = 9. Which one satisfies the original equation? Show a check for the one you keep.	**x = 9 satisfies the equation because sqrt(25) = 9 - 4 = 5.**
5	The candidates for sqrt(2x + 34) = x + 5 are x = 1 and x = -9. Which one works? Explain why the other is extraneous.	**x = 1 works because sqrt(36) = 1 + 5 = 6. The other candidate is extraneous: at x = -9, sqrt(16) = 4 but x + 5 = -4.**
6	Solve sqrt(x + 15) = x + 3. Check your candidates before choosing an answer.	**x = 1**

PART 2 · APPLY IT

1. **The screen is 6 feet wide.** $x^2 = 36$ gives candidates 6 and -6. Reject -6 because a width cannot be negative; $6^2 + 8^2 = 10^2$.
2. **The horizontal distance is 12 feet.** Squaring gives $x^2 + 25 = x^2 + 2x + 1$, so x = 12. Check: sqrt(12^2 + 25) = 13 = 12 + 1.

CHALLENGE

Isolate one radical: sqrt(x + 7) = 6 - sqrt(x - 5). Squaring and simplifying gives 12sqrt(x - 5) = 24, so sqrt(x - 5) = 2 and x = 9. Check: sqrt(16) + sqrt(4) = 4 + 2 = 6.

Accept checks written as substitutions or equalities. A candidate from a squared equation counts as a solution only if it satisfies the original equation and, in a context problem, represents a valid measurement.