LESSON MAKER PRO

Check Before You Keep

Test candidates in the original math statement.

GRADE 8 · 8A.AF.C

8A.AF.C "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 _____

THE BIG IDEA

Solving can produce candidates that do not work in the original equation, especially after squaring. Substitute each candidate into the original equation or inequality. Keep only the values that make it true.

WORKED EXAMPLE

Solve sqrt(x + 90) = x. Check both candidates.

1. Square both sides: $x + 90 = x^2$.
2. Factor: $0 = x^2 - x - 90 = (x - 10)(x + 9)$, so $x = 10$ or $x = -9$.
3. Check: sqrt(10 + 90) = 10, but sqrt(-9 + 90) = 9, not -9.

Answer: x = 10

PRACTICE 6 problems

1 Which candidate solves 4x + 3 = 15: x = 2 or x = 3? Show a substitution.

ANSWER _____

2 Which candidates satisfy 2x - 1 < 7: x = 3, x = 4, or x = 6? Check each one.

ANSWER _____

3 A student claims x >= 3 solves 7 - 2x >= 1. Check x = 4 to test the claim. Then write the correct solution inequality.

ANSWER _____

4 Check (1, 2) and (2, 1) in both equations: 2x + y = 4 and x - y = -1. Which pair solves the system?

ANSWER _____

5 Check x = 11 and x = 15 in |x - 13| = 2. Which candidates are solutions?

ANSWER _____

6 Squaring sqrt(x + 12) = x gives two candidates, x = 4 and x = -3. Check both in the original equation. Which is a solution?

ANSWER _____

APPLY IT Show your work

1 A music app charges $7 for a one-month plan plus $3 per song download. Nia has $22. One friend says she can download 5 songs; another says she can download 6. Write an inequality, check both claims, and find the greatest whole number of songs Nia can download.

WORK SPACE

ANSWER _____

2 You need at least 28 volunteer credits to join a school dance. You have 6 credits and earn 4 credits per event. A friend says 5 more events are enough. Write an inequality, check the claim, and find the fewest whole number of events you need.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Solve sqrt(3x + 12) = x - 2 by squaring. Check each candidate in the original equation, and explain why any candidate must be rejected.

WORK SPACE AND ANSWER

ANSWER KEY

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Which candidate solves 4x + 3 = 15: x = 2 or x = 3? Show a substitution.	**x = 3. Check: 4(3) + 3 = 15; 4(2) + 3 = 11.**
2	Which candidates satisfy 2x - 1 < 7: x = 3, x = 4, or x = 6? Check each one.	**Only x = 3. The left sides are 5, 7, and 11, respectively; only 5 < 7.**
3	A student claims x >= 3 solves 7 - 2x >= 1. Check x = 4 to test the claim. Then write the correct solution inequality.	**The claim is false: 7 - 2(4) = -1, and -1 is not at least 1. The correct inequality is x <= 3.**
4	Check (1, 2) and (2, 1) in both equations: 2x + y = 4 and x - y = -1. Which pair solves the system?	**(1, 2) solves the system: 2(1) + 2 = 4 and 1 - 2 = -1. The pair (2, 1) fails both equations.**
5	Check x = 11 and x = 15 in |x - 13| = 2. Which candidates are solutions?	**Both are solutions: |11 - 13| = 2 and |15 - 13| = 2.**
6	Squaring sqrt(x + 12) = x gives two candidates, x = 4 and x = -3. Check both in the original equation. Which is a solution?	**Only x = 4: sqrt(4 + 12) = 4, but sqrt(-3 + 12) = 3, not -3.**

PART 2 · APPLY IT

1. **7 + 3x <= 22; 5 songs** At x = 5, the cost is $22, which fits the budget. At x = 6, the cost is $25, which exceeds it.
2. **6 + 4x >= 28; 6 events** Five events give 26 credits, so the claim is false. Six events give 30 credits, and fewer events cannot reach 28.

CHALLENGE

Squaring gives $3x + 12 = (x - 2)^2$, so $0 = x^2 - 7x - 8 = (x - 8)(x + 1)$. The candidates are x = 8 and x = -1. For x = 8, sqrt(36) = 6 = 8 - 2. For x = -1, sqrt(9) = 3, but -1 - 2 = -3, so x = -1 must be rejected. The solution is x = 8.

Accept equivalent substitutions that correctly test candidates in the original statement. In the challenge, students should identify x = -1 as an extraneous result of squaring.