ALBERT

Name _____ Date _____

Rational and Radical Equations Worksheet

Algebra 2 · Common Core HSA-REI.A.2

> Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.

Practice

Builds the skill step by step.

1. Solve $\sqrt{x} = 7$.

2. Solve $\sqrt{(x + 3)} = 5$.

3. Solve $\frac{3}{x} = 6$.

4. Solve $\sqrt{(2x)} = 6$.

5. Solve $\frac{x}{4} = \frac{3}{2}$.

6. Solve $\sqrt{(x - 1)} + 2 = 6$.

7. What is an extraneous solution?

   A. a solution that is a fraction

   B. the largest solution

   C. a value found while solving that does not satisfy the original equation

   D. a solution that is negative

8. Solve $\frac{5}{x - 2} = 1$.

9. Solve $\sqrt[3]{x} = 3$.

10. How many solutions does $\sqrt{x} = -3$ have?

    A. one: $x = 9$

    B. one: $x = -9$

    C. two

    D. none, because a principal square root can't be negative

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On Level

Grade-level practice.

1. Solve $\sqrt{(x + 7)} = x + 1$.

2. Squaring $\sqrt{(x + 7)} = x + 1$ gives $x = 2$ or $x = -3$. Which value is extraneous?

3. Solve $\frac{1}{x} + \frac{1}{3} = \frac{1}{2}$.

4. Solve $\frac{x}{x - 3} = \frac{3}{x - 3} + 2$.

   A. no solution: $x = 3$ is extraneous

   B. $x = 3$

   C. $x = 0$

   D. $x = 6$

5. Solve $\sqrt{(3x + 1)} = \sqrt{(x + 9)}$.

6. Explain how squaring both sides of an equation can create an extraneous solution, and what to do about it.

7. Solve $\frac{x + 2}{x} = 3$.

8. Solve $4 + \sqrt{x} = x - 2$.

9. Solve $\frac{2}{x + 1} = \frac{4}{x + 5}$.

10. Solve $\sqrt[3]{(2x - 1)} = 3$.

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Challenge

Multi-step and word problems that stretch it.

1. Solve $\sqrt{(2x + 3)} - \sqrt{(x + 1)} = 1$. List them from least to greatest.

2. Solve $\frac{1}{x - 1} + \frac{2}{x + 1} = \frac{4}{x^2 - 1}$.

3. Solve $\frac{x^2}{x - 3} = \frac{9}{x - 3}$.

4. Solve $\sqrt{(x + 5)} = x - 1$.

5. Ana can paint a room in 6 hours. With Ben, it takes 4 hours. How many hours would Ben take alone?

6. A driver goes 60 miles at s miles per hour and returns at s + 10 miles per hour. The round trip takes 5 hours. What is s?

7. Why must you check solutions of an equation like $\frac{3}{x-2} = \frac{x+1}{x-2}$?

   A. Rational equations never have solutions.

   B. A solution might make a denominator 0.

   C. The solutions are always negative.

   D. The check is only needed for radicals.

8. Solve $\sqrt{(x + 2)} = x$. Explain how you handle any extraneous solution.

9. Solve $\frac{3}{x} + \frac{4}{x+1} = 2$. List them from least to greatest.

10. An object's speed after falling h meters is $v = \sqrt{(19.6h)}$ meters per second. From what height does it reach 14 meters per second?