Solving Radical Equations Worksheet Answer Key PDF

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Part 1: Building a Foundation

What is a radical equation?

undefined. A) An equation involving only whole numbers

undefined. B) An equation with a variable inside a radical ✓

undefined. C) An equation with no variables

undefined. D) An equation with fractions

A radical equation is defined as an equation that contains a variable within a radical expression.

Which of the following are examples of radical equations? (Select all that apply)

undefined. A) \(\sqrt{x} = 9\) ✓

undefined. B) \(x^2 + 5 = 0\)

undefined. C) \(\sqrt[3]{x + 1} = 2\) ✓

undefined. D) \(x + 3 = 7\)

Examples of radical equations include those that have a variable under a square root or cube root.

Explain why it is important to check for extraneous solutions when solving radical equations.

Checking for extraneous solutions is crucial because squaring both sides of a radical equation can introduce solutions that do not satisfy the original equation.

List the basic steps involved in solving a radical equation.

1. What is the first step?

Isolate the radical.

2. What do you do after isolating the radical?

Square both sides of the equation.

3. What is the final step?

Check for extraneous solutions.

The basic steps include isolating the radical, squaring both sides, solving the resulting equation, and checking for extraneous solutions.

Part 2: Understanding Radical Equations

What is the first step in solving the equation \(\sqrt{x + 4} = 6\)?

undefined. A) Subtract 4 from both sides

undefined. B) Square both sides ✓

undefined. C) Add 4 to both sides

undefined. D) Divide both sides by 6

The first step is to square both sides of the equation to eliminate the square root.

Why might squaring both sides of a radical equation introduce extraneous solutions? (Select all that apply)

undefined. A) It changes the equation's structure ✓

undefined. B) It simplifies the equation

undefined. C) It can create solutions that do not satisfy the original equation ✓

undefined. D) It eliminates the radical

Squaring both sides can create solutions that do not satisfy the original equation, leading to extraneous solutions.

Describe how you would verify a solution to a radical equation.

To verify a solution, substitute it back into the original equation and check if both sides are equal.

Part 3: Applying and Analyzing Radical Equations

Solve the equation \(\sqrt{x - 2} = 3\). What is the value of \(x\)?

undefined. A) 7
undefined. B) 9
undefined. C) 11 ✓
undefined. D) 5

The value of \(x\) is 11 after squaring both sides and solving.

Solve the equation \(\sqrt[3]{2x + 1} = 3\). Which of the following are possible values of \(x\)? (Select all that apply)

undefined. A) 13 ✓
undefined. B) 26
undefined. C) 14 ✓
undefined. D) 27

Possible values of \(x\) include those that satisfy the equation after isolating and solving for \(x\).

Solve the equation \(\sqrt{x + 5} + 2 = x\) and verify your solution.

After solving, verify by substituting the solution back into the original equation.

In the equation \(\sqrt{x} + 4 = x\), what must be true about \(x\) for the equation to have a solution?

undefined. A) \(x\) must be negative
undefined. B) \(x\) must be greater than or equal to 4 ✓
undefined. C) \(x\) must be less than 4
undefined. D) \(x\) can be any real number

For the equation to have a solution, \(x\) must be greater than or equal to 4.

Part 4: Synthesis and Reflection

Evaluate the solutions of the equation \(\sqrt{x + 6} = x - 2\). Which of the following is a valid solution?

undefined. A) 4
undefined. B) 2
undefined. C) 6 ✓

undefined. D) 8

The valid solution is 6, as it satisfies the original equation.

Consider the equation \(\sqrt{x} = x - 2\). Which of the following steps are necessary to solve this equation? (Select all that apply)

undefined. A) Isolate the radical ✓

undefined. B) Square both sides ✓

undefined. C) Check for extraneous solutions ✓

undefined. D) Simplify the equation

Necessary steps include isolating the radical, squaring both sides, and checking for extraneous solutions.

Create a radical equation that has exactly one solution, and explain the steps to solve it.

An example could be \(\sqrt{x} = x - 1\), which has one solution at \(x = 1\).

Propose a real-world scenario where solving a radical equation might be necessary, and outline the steps to solve it.

1. What is the scenario?

Calculating the height of a tree using its shadow.

2. What is the first step?

Set up the equation based on the measurements.

3. What is the final step?

Solve the equation and verify the height.

An example could be calculating the height of a tree using the shadow length, leading to a radical equation.