

# Solving Radical Equations Worksheet

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## Part 1: Building a Foundation

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### What is a radical equation?

*Hint: Think about the definition involving variables and radicals.*

- A) An equation involving only whole numbers
- B) An equation with a variable inside a radical
- C) An equation with no variables
- D) An equation with fractions

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

*Hint: Look for equations that include radicals.*

- A)  $\sqrt{x} = 9$
- B)  $x^2 + 5 = 0$
- C)  $\sqrt[3]{x + 1} = 2$
- D)  $x + 3 = 7$

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

*Hint: Consider how squaring both sides of an equation can affect solutions.*

### List the basic steps involved in solving a radical equation.

*Hint: Think about the process from isolating the radical to checking solutions.*

1. What is the first step?

2. What do you do after isolating the radical?

3. What is the final step?

## Part 2: Understanding Radical Equations

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

*Hint: Consider what you need to do to eliminate the square root.*

- A) Subtract 4 from both sides
- B) Square both sides
- C) Add 4 to both sides
- D) Divide both sides by 6

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

*Hint: Think about how squaring affects the equation.*

- A) It changes the equation's structure
- B) It simplifies the equation
- C) It can create solutions that do not satisfy the original equation
- D) It eliminates the radical

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

*Hint: Consider the steps you would take after finding a solution.*

### Part 3: Applying and Analyzing Radical Equations

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

Hint: Think about what you need to do to isolate  $x$ .

- A) 7
- B) 9
- C) 11
- D) 5

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

Hint: Consider how to isolate  $x$  in this equation.

- A) 13
- B) 26
- C) 14
- D) 27

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

Hint: Start by isolating the radical and then solve for  $x$ .

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

Hint: Consider the implications of the square root in the equation.

- A)  $x$  must be negative
- B)  $x$  must be greater than or equal to 4
- C)  $x$  must be less than 4
- D)  $x$  can be any real number

## Part 4: Synthesis and Reflection

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

Hint: Consider the implications of the square root on the solution.

- A) 4
- B) 2
- C) 6
- D) 8

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

Hint: Think about the process of isolating the radical and solving.

- A) Isolate the radical
- B) Square both sides
- C) Check for extraneous solutions
- D) Simplify the equation

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

Hint: Think about the structure of the equation you create.

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

*Hint: Consider situations involving measurements or areas.*

1. What is the scenario?

2. What is the first step?

3. What is the final step?