

Chapters 2.5: Radical Equations

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Radical Equations

An equation in which a variable is in the radicand of a radical expression is called a **radical equation**. For example,

$$\sqrt{5n - 4} - 9 = 0.$$

Solve a Radical Equation With One Square Root

- 1 Isolate the radical on one side of the equation.
- 2 Square both sides of the equation.
- 3 Solve the new equation.
- 4 Check the answer in the original equation. (Note: Sometimes a solution may be an extraneous solution!)

Example: Solve. $\sqrt{5n - 4} - 9 = 0$

Radical Equations with One Square Root

Example: Solve.

- $\sqrt{p-1} + 1 = p$
- $\sqrt{r+4} - r + 2 = 0$
- $3\sqrt{3x-5} - 8 = 4$

Radical Equations with Two Radicals

If the radical equation has two radicals, we start out by isolating one of them. It often works out easiest to isolate the more complicated radical first.

Example: Solve. $\sqrt{4x - 3} = \sqrt{3x + 2}$

Sometimes after raising both sides of an equation to a power, we still have a variable inside a radical. When that happens, we repeat Step 1 and Step 2 of our procedure. We isolate the radical and square both sides of the equation again.

Example: Solve. $\sqrt{m} + 1 = \sqrt{m + 9}$

Radical Equations

Example: Solve.

- $\sqrt{x-1} + 2 = \sqrt{2x+6}$
- Marissa dropped her sunglasses from a bridge 400 feet above a river. If an object is dropped from a height of h feet, the time it takes for an object to hit the ground is $\frac{h}{4}$ seconds. Find how many seconds it took for the sunglasses to reach the river.
- **On Your Own:** An accident investigator measured the skid marks of the car. The length of the skid marks was 76 feet. The speed of the car before the brakes were applied is $\sqrt{24d}$ feet/second. Find the speed of the car before the brakes were applied. Round your answer to the nearest tenth.