

Solving Radical Equations

Equations like $s = 18\sqrt{h-2}$ that contain radicals with variables in the radicand are called radical equations.

Don't forget to mention that the quantity under the root sign must be positive before you start solving.

Rule 1: To solve an equation with radicals:

Step 1: Determine the condition

Step 2: Isolate the radical

Step 3: Apply the power rule (raise both sides of the equation to the same power)

Step 4: Solve the resulting equation

Step 5: Check all solutions in the original equation

Definition 1: By raising both sides of an equation to a power, some solutions may have been introduced that do not make the original equation true. These solutions are called **extraneous solutions**.

Check your results for an extraneous solution - remembering that:

- a) an even index represents a positive root
- b) a negative radicand with an even index yields "NO REAL SOLUTION"

Example 1: Solve each equation. Check your solutions

1) $\sqrt{x} + 5 = 7$

For the equation to be true, $x \geq 0$

$$\sqrt{x} + 5 - 5 = 7 - 5$$

$$\Rightarrow \sqrt{x} = 2$$

$$\Rightarrow (\sqrt{x})^2 = (2)^2$$

$$\Rightarrow x = 4$$

Check: $x = 4 \Rightarrow \sqrt{x} + 5 = \sqrt{4} + 5 = 2 + 5 = 7 \checkmark$