



Radical Equations: Equations with radicals that have variables in the radicands.

Ex. $\sqrt{c} + 8 = 13$ or $\sqrt{3z} - 8 = -6$

When solving a radical equation, remember to:

- ✓ identify any restrictions on the variable
- ✓ identify whether any roots are extraneous by determining whether the values satisfy the original equation.

Solving Rad Equations

Ex. 1: State the restrictions and solve the following.

$$5 + \sqrt{2x - 1} = 12$$

✓ step 1: isolate the radical

✓ step 2: solve



Ex. 2: Identify any restrictions and solve the equation.

$$-8 + \sqrt{\frac{3y}{5}} = -2$$



Ex. 3: What are the restrictions on 'n' if the equation
 $n - \sqrt{5 - n} = -7$ involves real numbers? Solve.



Solving Rad Equations

STATE THE RESTRICTIONS
ON THE FOLLOWING EXPRESSIONS

$$4\sqrt{9 - 2y}$$

$$2\sqrt{x + 7}$$

$$\sqrt{3x}$$

$$\sqrt{2x + 5}$$

$$\sqrt{x - 11}$$

$$\sqrt[3]{3x + 1}$$

$$\sqrt[4]{x + 1}$$

Solving Rad Equations

Ex. 4: Solve $7 + \sqrt{3x} = \sqrt{5x+4} + 5, x \geq 0$



Solving Rad Equations

Ex. 5: Solve $\sqrt{3+m} + \sqrt{2m-1} = 5, m \geq \frac{1}{2}$.



Key Ideas

- You can model some real-world relationships with radical equations.
- When solving radical equations, begin by isolating one of the radical terms.
- To eliminate a square root, raise both sides of the equation to the exponent two. For example, in $3 = \sqrt{c + 5}$, square both sides.

$$3^2 = (\sqrt{c + 5})^2$$

$$9 = c + 5$$

$$4 = c$$

- To identify whether a root is extraneous, substitute the value into the original equation. Raising both sides of an equation to an even exponent may introduce an extraneous root.
- When determining restrictions on the values for variables, consider the following:
 - Denominators cannot be equal to zero.
 - For radicals to be real numbers, radicands must be non-negative if the index is an even number.