

Algebra 1

Chapter 10

Section 10-4

Radical Equations

$$\sqrt{2-x} + 7 = 11$$

$$\begin{array}{r} -7 \quad -7 \\ \hline (\sqrt{2-x})^2 = (4)^2 \end{array}$$

$$\begin{array}{r} 2-x = 16 \\ -2 \quad -2 \end{array}$$

$$\begin{array}{r} -x = 14 \\ \frac{-1}{-1} \quad \frac{-1}{-1} \end{array}$$

$$x = -14$$

Steps:

Isolate Radical

Cancel Radical
(square it)

Solve for x.

Solving Radical Equations

$$\begin{aligned}\sqrt{x} - 4 &= 3 \\ +4 &+4 \\ (\sqrt{x})^2 &= 7^2 \\ x &= 49\end{aligned}$$

$$\begin{aligned}(\sqrt{x-9})^2 &= (6)^2 \\ x-9 &= 36 \\ +9 &+9 \\ x &= 45\end{aligned}$$

Solving Radical Equations

$$\begin{array}{l}
 (\sqrt{x^2 + 4})^2 = (\sqrt{5x})^2 \\
 x^2 + 4 = 5x \\
 \quad -5x \quad -5x \\
 x^2 - 5x + 4 = 0 \\
 \underline{(x-1)}(\underline{x-4}) = 0 \\
 x-1=0 \qquad x-4=0 \\
 x=1 \qquad \qquad x=4
 \end{array}$$

$$\begin{array}{l}
 (\sqrt{5x + 15})^2 = (\sqrt{30x - 10})^2 \\
 5x + 15 = 30x - 10 \\
 \quad +10 \qquad \quad +10 \\
 \cancel{5x} + 25 = 30x \\
 \quad -5x \qquad \quad -5x \\
 \frac{25}{25} = \frac{25}{25}x \\
 x = 1
 \end{array}$$

Solving Radical Equations:

Always check your solutions!

$$(\sqrt{x^2 + 225})^2 = 17^2$$

$$x^2 + 225 = 289$$

$$-225 \quad -225$$

$$\sqrt{x^2} = \sqrt{64}$$

$$x = -8, 8$$

$$(\sqrt{13x})^2 = (\sqrt{x^2 + 30})^2$$

$$13x = x^2 + 30$$

$$-13x \quad -13x$$

$$0 = x^2 - 13x + 30$$

$$0 = (x - 3)(x - 10)$$

$$x - 3 = 0$$

$$x = 3$$

$$x - 10 = 0$$

$$x = 10$$

A circular balloon is being inflated for an experiment. The radius (r) of the balloon is approximated by the equation:

$$r = \sqrt{\frac{SA}{12.566}}$$

where SA is the surface area of the balloon. The desired radius of the balloon is 5.5 inches. Find the surface area of the balloon to the nearest tenth of a square inch.

$$(5.5)^2 = \left(\sqrt{\frac{SA}{12.566}} \right)^2$$

$$12.566 \cdot 30.25 = \frac{SA}{12.566} \cdot 12.566$$

$$380.1 \text{ sq. in} = SA$$