

Name: _____

Date: _____

Class worksheet: Alg2H
 Powers and Roots (IV): Solving radical equations
 (book chapter 7, page 317)

Principle of powers

if $a=b$ ^{Then} $\Rightarrow a^n = b^n$ _{is true.}

NOTE: $a=b \Rightarrow a^2=b^2$
 $a^2=b^2 \nRightarrow a=b$

Solve:

$$\sqrt{a} + 2 = 7$$

$$\sqrt{a} = 5$$

$$\boxed{a = 25} \checkmark$$

Check:

$$\begin{aligned} \sqrt{25} + 2 &\stackrel{?}{=} 7 \\ 5 + 2 &\stackrel{?}{=} 7 \checkmark \end{aligned}$$

Solve:

$$3\sqrt{x} = 2\sqrt{x} - 1$$

$$(3-2)\sqrt{x} = -1$$

$$\sqrt{x} = -1 \Rightarrow x = 1$$

Check:

$$3 \cdot \sqrt{1} \stackrel{?}{=} 2\sqrt{1} - 1$$

$$\begin{aligned} 3 &\stackrel{?}{=} 2 - 1 \\ 3 &\stackrel{?}{=} 1 \end{aligned}$$

X

NOT a solution

$$\boxed{\text{No Solutions}}$$

Solve:

$$x - 5 = \sqrt{18 - 2x}$$

$$(x-5)^2 = 18 - 2x$$

$$x^2 - 10x + 25 = 18 - 2x$$

$$x^2 - 8x + 7 = 0 \rightarrow x_{1,2} = \frac{8 \pm \sqrt{64 - 28}}{2} = \frac{8 \pm 6}{2} \rightarrow \begin{matrix} 7 \\ 1 \end{matrix}$$

Solution

Check:

$$\boxed{x=7} \leftarrow \begin{matrix} 7-5 \stackrel{?}{=} \sqrt{18-2 \cdot 7} \\ 2 \stackrel{?}{=} \sqrt{18-14} \\ 2 \stackrel{?}{=} 2 \checkmark \end{matrix}$$

$$\begin{matrix} x=1 \\ 1-5 \stackrel{?}{=} \sqrt{18-2 \cdot 1} \\ -4 \stackrel{?}{=} \sqrt{16} \\ -4 \stackrel{?}{=} 4 \quad X \end{matrix} \leftarrow \begin{matrix} \text{not} \\ \text{a solution} \end{matrix}$$

Solve:

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

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

$$x^2 - 10x + 25 = x + 7$$

$$x^2 - 11x + 18 = 0$$

$$x_{1,2} = \frac{11 \pm \sqrt{121 - 72}}{2} = \frac{11 \pm \sqrt{49}}{2} = \frac{11 \pm 7}{2} \rightarrow \begin{matrix} 9 \\ 2 \end{matrix}$$

Check:

$$\boxed{9} \leftarrow \begin{matrix} \text{solution!} \\ 9 \stackrel{?}{=} \sqrt{9+7} + 5 \\ 9 \stackrel{?}{=} \sqrt{16} + 5 \\ 9 \stackrel{?}{=} 4 + 5 \checkmark \end{matrix}$$

$$\begin{matrix} 2 \\ 2 \stackrel{?}{=} \sqrt{2+7} + 5 \\ 2 \stackrel{?}{=} 3 + 5 \\ 2 \stackrel{?}{=} 8 \quad X \end{matrix} \leftarrow \begin{matrix} \text{not} \\ \text{solution} \end{matrix}$$