

## Unit 4: Radical Expressions & Equations

### 4.6 Radical Equations

**Radical Equation:** an equation with radicals that have variables in the radicands. [In this course we will only be considering radical equations of index 2, ie. square root equations]

When solving radical equation you **MUST** check for **extraneous solutions**.  
 $\rightarrow$  false answers

To solve radical equations, isolate the radical expression, square both sides, and then solve for the variable.

ex. Solve

$$a) \quad \underset{-5}{5} + \underset{-1}{\sqrt{2x-1}} = \underset{-5}{12}$$

$$\cancel{\sqrt{2x-1}} = 7^2$$

$$2x-1 = 49$$

$$\boxed{x = 25}$$

ch

$$5 + \sqrt{2(25)-1} \stackrel{?}{=} 12$$

$$5 + \sqrt{49}$$

$$5 + 7$$

$$12 = 12 \checkmark$$

$$c) \quad \underset{-1}{n} - \underset{-1}{\sqrt{5-n}} = \underset{-1}{-7}$$

$$\underset{-1}{-\sqrt{5-n}} = \underset{-1}{-7-n}$$

$$\sqrt{5-n} = (n+7)^2$$

$$\underset{-1}{5-n} = \underset{+1}{n^2 + 14n + 49} \underset{-1}{}$$

$$0 = n^2 + 15n + 44$$

$$0 = (n+4)(n+11)$$

$$n+4=0 \quad \text{or} \quad n+11=0$$

$$\boxed{n = -4}$$

$$\cancel{n = -11}$$

$$b) \quad \underset{-8}{\sqrt{x+3}} + \underset{-8}{8} = \underset{-8}{6}$$

$$\sqrt{x+3}^2 = (-2)^2 \rightarrow \sqrt{x+3} = -2$$

not possible

$$x+3 = 4$$

$$\cancel{x = 1} \quad \text{extraneous root}$$

ch

$$\sqrt{\cancel{x+3}+3} + 8 \stackrel{?}{=} 6$$

$$2 + 8$$

$$10 \neq 6$$

$$\boxed{\text{no solution}}$$

check

$$-4 - \sqrt{5-(-4)} \stackrel{?}{=} -7$$

$$-4 - 3$$

$$-7 = -7 \checkmark$$

$$-11 - \sqrt{5-(-11)} \stackrel{?}{=} -7$$

$$-11 - 4$$

$$-15 \neq -7$$

