

Lesson 5.11- SWBAT solve radical equations.

Kickoff:

Rationalize the denominator

$$1) \frac{2\sqrt{2}-7}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{2\sqrt{10}-7\sqrt{5}}{5}$$

2) ~~$\frac{2\sqrt{2}}{\sqrt{6}}$~~

3) $\frac{6\sqrt{5}}{1-\sqrt{3}} \cdot \frac{(1+\sqrt{3})}{(1+\sqrt{3})} = \frac{5\sqrt{5}+5\sqrt{15}}{1-2} = \frac{5\sqrt{5}+5\sqrt{15}}{-1}$

Solve the following: 4) $2x + 5 = 25$

$$2x = 20$$

$$\frac{2x}{2} = \frac{20}{2}$$

$$x = 10$$

① $\frac{6}{5}\sqrt{2}$ ④ $\frac{15}{4} + \frac{3}{4}\sqrt{3}$

② $\sqrt{10}$ ⑤ $-\frac{1}{2}\sqrt{3} + \frac{5}{2}$

③ $2 - \frac{\sqrt{6}}{2}$ ⑥ $2 + \sqrt{5}$

6) $\frac{1+\sqrt{5}}{3-\sqrt{5}} \cdot \frac{(3+\sqrt{5})}{(3+\sqrt{5})} = \frac{3+\sqrt{5}+3\sqrt{5}+5}{9-5} = \frac{8+4\sqrt{5}}{4} = 2+\sqrt{5}$

5) $\frac{11}{\sqrt{3}-5} \cdot \frac{(\sqrt{3}+5)}{(\sqrt{3}+5)} = \frac{11\sqrt{3}+55}{3-25} = \frac{11\sqrt{3}+55}{-22} = \frac{\sqrt{3}+5}{-2}$

Solving Radical Equations → by itself

- 1) Isolate the radical
- 2) Square both sides of the equations. **this will get rid of the radical sign**
- 3) Solve
- 4) Check for extraneous roots

Examples:

1) $\sqrt{x-1} = 2$ Check

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

$$x-1 = 4$$

$$x+1$$

$$x = 5$$

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

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

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

$$2x-1 = 1$$

$$2x = 2$$

$$x = 1$$

2) $6 + \sqrt{x} = 11$ Check

$$\sqrt{x} = 5$$

$$(\sqrt{x})^2 = (5)^2$$

$$x = 25$$

Check: $6 + \sqrt{25} = 11$
 $6 + 5 = 11$
 $11 = 11 \checkmark$

4) $\sqrt{y-4} = 9$ Check

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

$$y-4 = 81$$

$$y = 85$$

Check: $\sqrt{85-4} = 9$
 $\sqrt{81} = 9$
 $9 = 9$

5) $\sqrt{x} + 3 = 10$ Check

$$\sqrt{x} = 7$$

$$(\sqrt{x})^2 = (7)^2$$

$$x = 49$$

Check: $\sqrt{49} + 3 = 10$
 $7 + 3 = 10$
 $10 = 10 \checkmark$

7) $8 + \sqrt{2x-1} = 15$ Check

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

$$2x-1 = 49$$

$$2x = 50$$

$$x = 25$$

Check: $8 + \sqrt{2(25)-1} = 15$
 $8 + \sqrt{49} = 15$
 $8 + 7 = 15$
 $15 = 15 \checkmark$

8) $\sqrt{3-y} - 1 = 2$ Check

$$\sqrt{3-y} = 3$$

$$3-y = 9$$

$$-y = 6$$

$$y = -6$$

9) $\sqrt{x} = 16$ Check

$$\sqrt{x} = 16$$

$$x = 256$$

Check: $\sqrt{256} = 16$
 $16 = 16 \checkmark$

10) $\sqrt{x} = -3$ Check

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

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

$$x = 9$$

Check: $\sqrt{9} = -3$
 $3 = -3$
 $3 \neq -3$
 No solution

11) $\sqrt{1+y} = 3$

Check

$$1+y=9$$

$$y=8$$

12) $-\sqrt{2y+5} = -3$

Check

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

$$2y+5=9$$

$$\frac{2y}{2} = \frac{4}{2}$$

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

$$\sqrt{-2(-1)+5} = 3$$

$$-3 = -3 \checkmark$$