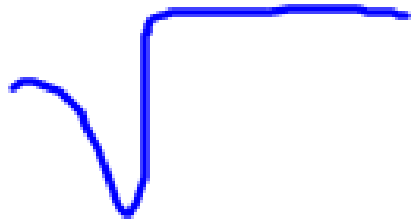


By the end of the lesson, we will be able to:

~ Solve equations with radicals in them.

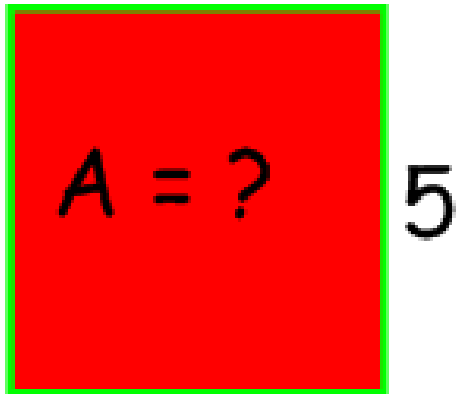
What is a radical?



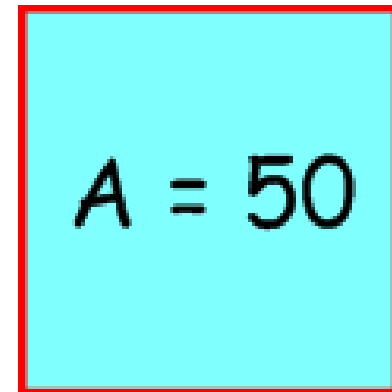
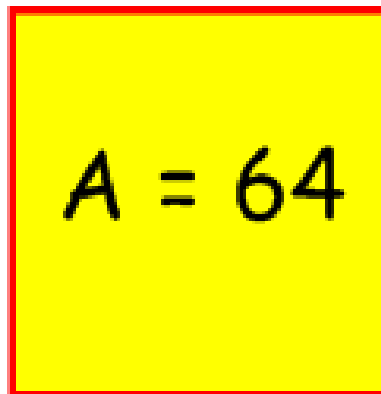
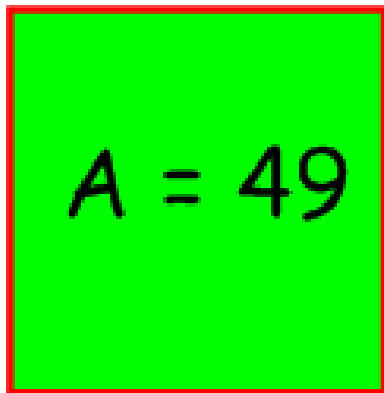
What is an example of a Radical Equation?

$$\sqrt{x} - 6 = 3$$

What is the area of the square?



What is the length of a side of the square?



## Steps for solving radical equations:

1. Isolate the radical. (If there is more than one radical, isolate the biggest radical expression.)
2. Square both sides of the equation. (Or cube if radical is cube root, etc.)
- \* 3. If there are additional radicals left, repeat steps 1 and 2.
4. Isolate the variable. (Solve for  $x$ .)
5. Check your solution. (Some solutions may be extraneous.)  
doesn't work

## Examples:

a.)  $(\sqrt{x})^2 = (4)^2$   
 $x = 16$

b.)  $(\sqrt[3]{x-20})^3 = (5)^3$   
 $x-20 = 125$   
 $\quad +20 \quad +20$ 

---

 $x = 145$

c.)  $5 + \sqrt{h+1} = 8$   
 $\quad -5 \quad \quad -5$ 

---

 $(\sqrt{h+1})^2 = (3)^2$   
 $h+1 = 9$   
 $\quad -1 \quad -1$ 

---

 $h = 8$

d.)  $5 + \sqrt{w+3} = -8$   
 $\quad -5 \quad \quad -5$ 

---

 $\sqrt{w+3} = -13$   
 $\text{no solution}$

Lesson 26: Radical Equations (5.8)

## Examples:

$$e.) \frac{2\sqrt{m-3}}{2} = \frac{7}{2}$$

$$(\sqrt{m-3})^2 = \left(\frac{7}{2}\right)^2$$

$$m-3 = \frac{49}{4}$$

+3                      +3

$$m = \frac{49}{4} + \frac{3 \cdot 4}{1 \cdot 4}$$

$$m = \frac{49}{4} + \frac{12}{4}$$

$$m = \frac{61}{4}$$

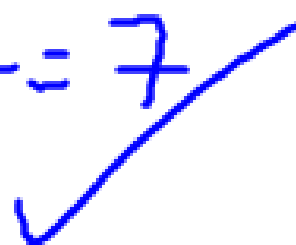
check

$$2\sqrt{\frac{61}{4} - \frac{3}{1}} = 7$$

$$2\sqrt{\frac{61}{4} - \frac{12}{4}} = 7$$

$$2\sqrt{\frac{49}{4}} = 7$$

$$\frac{2}{1} \left( \frac{7}{2} \right) = 7$$

$$7 = 7$$


Lesson 26: Radical Equations (5.8)

## Examples:

f.) Solve for L:  $T = 2\pi \sqrt{\frac{L}{g}}$

$$\left(\frac{T}{2\pi}\right)^2 = \left(\sqrt{\frac{L}{g}}\right)^2$$

$$\cancel{g} \frac{T^2}{4\pi^2} = \frac{L}{\cancel{g}} \cdot \cancel{g}$$

$$L = \frac{T^2 g}{4\pi^2}$$

Lesson 26: Radical Equations (5.8)

## Examples:

g.)  $(3y - 1)^{\frac{1}{3}} - 2 = 0$

$$\begin{array}{r} \sqrt[3]{3y-1} - 2 = 0 \\ +2 \quad +2 \end{array}$$

$$\left(\sqrt[3]{3y-1}\right)^3 = (2)^3$$

$$\begin{array}{r} 3y-1 = 8 \\ +1 \quad +1 \end{array}$$

$$\frac{3y}{3} = \frac{9}{3}$$

$$\boxed{y = 3}$$

Check:

$$\sqrt[3]{3(3)-1} - 2 = 0$$

$$\sqrt[3]{9-1} - 2 = 0$$

$$\sqrt[3]{8} - 2 = 0$$

$$2 - 2 = 0$$





## Examples:

$$h.) (2n + 1)^{\frac{1}{4}} + 5 = 2$$

$$\sqrt[4]{2n+1} + 5 = 2$$

---

$$\sqrt[4]{2n+1} = -3$$

No Solution

even index can't be neg

## Examples:

$$\text{i.) } \sqrt{x+21} - 1 = \sqrt{x+12}$$

$$(\sqrt{x+21})^2 = (\sqrt{x+12} + 1)^2$$

$$x+21 = (\sqrt{x+12} + 1)(\sqrt{x+12} + 1)$$

$$x+21 = x+12 + \sqrt{x+12} + \sqrt{x+12} + 1$$

$$\begin{array}{r} x+21 = x+13 + 2\sqrt{x+12} \\ -x \quad -13 \quad -x \quad -13 \\ \hline \end{array}$$

$$\frac{8}{2} = \frac{2\sqrt{x+12}}{2}$$

$$4 = \sqrt{x+12}$$



$$(4)^2 = (\sqrt{x+12})^2$$

$$\begin{array}{r} 16 = x+12 \\ -12 \quad -12 \\ \hline \end{array}$$

$$\boxed{4 = x}$$

Check:

$$\sqrt{4+21} - 1 = \sqrt{4+12}$$

$$\sqrt{25} - 1 = \sqrt{16}$$

$$5 - 1 = 4$$

$$4 = 4$$



## Examples:

$$j.) \sqrt{x-1} = \sqrt{x} - \sqrt{5}$$

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

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

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

$$x + 4 + 2\sqrt{5x-5} = x$$

$$\begin{array}{r} x + 4 \\ -x - 4 \\ \hline \end{array} \quad \begin{array}{r} -x - 4 \\ -x - 4 \\ \hline \end{array}$$

$$\frac{2\sqrt{5x-5}}{2} = \frac{-4}{2}$$

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

No Solution

By the end of the lesson, we will be able to:

~ Solve equations with radicals in them.

## Homework:

Journal 26

Due in Math LAB

Assignment 26

Due in B1 next time