Math 1

Solving Radical Equations

Equations with radicals that have variables in the radicand are called ________________________.
To solve a radical equation ____
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Example 1: Solve $\sqrt{x} + 7 = 16$

You Try! Solve $\sqrt{x} - 5 = -2$

Example 2: Solve $\sqrt{5t - 11} = \sqrt{t + 5}$

You Try! $\sqrt{7x - 4} = \sqrt{5x + 10}$

Example 3: Solve $\sqrt{3x} = \sqrt{x + 6}$

You Try! Solve $(2x)^{\frac{1}{2}} = (x + 5)^{\frac{1}{2}}$

Example 4: Solve $(7x + 6)^{\frac{1}{2}} - (9 + 4x)^{\frac{1}{2}} = 0$

You Try! Solve $\sqrt{3x + 2} - \sqrt{2x + 7} = 0$

Example 5: Solve $\sqrt{x+1} + 2 = 4$

You Try! Solve $-4\sqrt{6x + 37} = -4$

Using Radical Equations:

The time *t* in seconds it takes for a pendulum of a clock to complete a full swing is approximated by the equation $t = 2\sqrt{\frac{x}{3.3}}$, where x is the length of the pendulum, in feet. If the pendulum of clock completes a full swin in 3 s, what is the length of the pendulum? Round to the nearest tenth of a foot.

You are making a tire swing for a playground. The time *t* in second for the tire to make one swing is given by $t = 2\sqrt{\frac{x}{3.3}}$ where x is the length of the swing in feet. You want one swing to take 2.5s. How many feet long should the swing be?

Identifying Equations with Extraneous Solutions

Sometimes when we check radical equations, the solution *doesn't work*. We call these types of solutions ________________ ________________. Example:

Example 6: Solve $n = \sqrt{n+12}$

You try! Solve $-y = \sqrt{y+6}$

Example 7: Solve $\sqrt{3y} + 8 = 2$

You Try! Solve $6 - \sqrt{2x} = 10$

Practice: Complete the following problems in class for credit!

1. Solve $\sqrt{x+8} + 9 = 5$
2. Solve $\sqrt{4x+1} - 5 = 0$
3. Solve $3 + \sqrt{2x-3} = 8$
4. Solve $3\sqrt{6-3x} - 6 = 0$
5. Solve $\sqrt{x-3} = \sqrt{x+5}$
6. Solve $\sqrt{7p+5} = \sqrt{p-3}$
7. Solve $5(x+3)^{\frac{1}{2}} - 1 = 24$
8. Solve $(3x)^{\frac{1}{2}} = (x+6)^{\frac{1}{2}}$
9. Solve $3\sqrt{4x+1} - 6 = 3$
10. Solve $3 - \sqrt{4a+1} = 12$