Math 060 WORKSHEET NAME:___________________________

10.1 Solving Quadratic Equations by the Square Root Property

Previously we learned how to solve quadratic equations by factoring. We saw that this method was limited to only quadratics that factored. In this section we look at another technique to solve quadratic equations in a special form.

A quadratic equation is of the form $ax^2 + bx + c = 0$. In this section we will solve with $b = 0$. The method we use is based on the fact that square roots undo squares.

The following property is motivated by the following:

If $x^2 = 64$, then $x = \sqrt{64} = 8$ or $x = -\sqrt{64} = -8$. (Two solutions + and -)

If $x^2 = 144$, then $x =$____ or ____

We have a shorthand way of writing the two solutions 8 or -8: ± 8

THE SQUARE ROOT PROPERTY:

If $x^2 = a$, then $x = \pm\sqrt{a}$

Note: If a is a perfect square, we just take the square root. If a is not perfect, then we write the radical in simplified form.

EXAMPLE: Solve

a.) $x^2 = 81$ b.) $x^2 = 8$ c.) $x^2 - 49 = 0$

d.) $x^2 - 8 = 16$ e.) $(x-1)^2 = 169$ f.) $(2x-1)^2 = 196$

You can see that when you have a perfect square on both sides of the equation the square root method is the quickest.

EXAMPLE: Solve

a.) $(3x-9)^2 = 27$ b.) $(7x-4)^2 = 28$

Now you have seen some that don't have perfect squares on both sides. The answers will contain radicals. To get a better idea of the actual value you need a calculator to approximate the radicals.

i.e $\frac{-3 \pm 2\sqrt{2}}{2} \approx \frac{-3 \pm 2 \cdot 1.41}{2} = \frac{-3 \pm 2.48}{2} = \frac{-1.52}{2} = .76$ or $\frac{-5.48}{2} = 2.74$.