Algebra 1 ECA Remediation **Lesson 35**

Roots, zeros, and x-intercepts of Quadratic Equations.

We will be using what we have learned about quadratic functions, factoring, and binomial factors to solve quadratic equations to find its roots, zeros, and x-intercepts.

Example #1

Write the equation of the quadratic function that has x-intercepts at (-17, 0) and (6,0).

In this case, $x = -17$ and $x = 6$. In order to find the binomial factors that would produce such intercepts, work to get x equal to 0.

This results in two equations: $(x + 17) = 0$ and $(x - 6) = 0$.

Using the zero-product property in reverse, we now see that $(x + 17)(x - 6) = 0$.

This produces the function $y = (x + 17)(x - 6)$.

Example #2

What are the zeros of$y = x^2 - 2x - 24$?

In order to solve a quadratic equation, it must be set equal to zero. So, substitute a 0 in for$y$.

$y = x^2 - 2x - 24$ becomes 0= $x^2 - 2x - 24$. The first step is to see if the quadratic is factorable. In this case it is. So, what are factors of -24 that add up to -2? You should be able to determine that -6 and 4 fit those requirements. Therefore, the factors of this quadratic are $(x - 6)(x + 4)$. This conclusion will now result in this new equation: $(x - 6)(x + 4) = 0$.

The Zero Product Property allows us to separate the two factors and set them equal to zero:

$x - 6 = 0$ and $x + 4 = 0$. Solving these equation gives zeros at $x = 6$ and $x = -4$.

Examples #3

What are the x-intercepts of the graph of $y = 2x^2 + 7x - 15$?

Again, the equation must be equal to zero: $2x^2 + 7x - 15 = 0$ Start by factoring, if possible. This quadratic is factorable. So, what are factors of -30 that add up to 7. You should be able to determine that 10 and -3 work. By using the Factor by Grouping Method, you can find the two binomial factors to be $(2x - 3)$ and $(x + 5)$.

This results in the new equation: $(2x - 3)(x + 5) = 0$.

The Zero Product Property allows us to separate the two factors and set them equal to zero:

$2x - 3 = 0$ and $x + 5 = 0$. Solving these equation gives zeros at $x = \frac{3}{2}$ and $x = -5$.This means the x-intercepts are $\left(\frac{3}{2}, 0\right)$ and $(-5,0)$.