5.5: QUADRATIC FUNCTIONS IN FACTORED FORM

Is the relation $y = 2(x + 4)(x - 3)$ quadratic?

What are the x –intercepts (i.e. zeros, roots) of the relation?

What do you notice about the zeros and the original equation?

The factored form of a quadratic relation looks like $\mathbf{y = a(x - s)(x - t)}$.
- The direction of opening is determined by the value of "a"
- The zeros are $x = s$ and $x = t$
- The x-coordinate of the vertex can be determined using the formula $\dfrac{s+t}{2}$ since the vertex lies on the axis of symmetry which is halfway between the two zeros.
- To get the y-coordinate of the vertex, substitute the x-coordinate into the equation of the quadratic relation.

Examples:
For each relation, write in proper factored form (if not already), determine the direction of opening, the zeros, the vertex, the y-intercept, and sketch the graph.
a) $y = (x + 3)(x - 4)$

b) $y = 3(x + 1)(x - 3)$

c) $y = (3 + x)(2 - x)$

WRITING EQUATIONS FOR PARABOLAS IN FACTORED FORM:

To write an equation of a parabola in factored form you need to know the zeros and one other point on the parabola.

Examples: Find the equation (in factored form) for each parabola.
a) zeros are –3 and 5, the y-intercept is –75

b) zeros are 3 and 7, maximum value is 6