SM 2

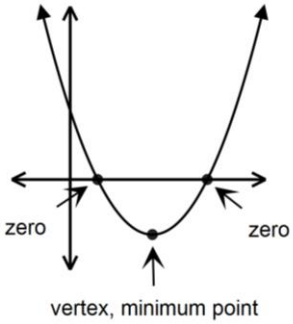
Date: **Section:** 7.3

Objective: Find the zeros of quadratic functions and the *x*-intercepts of their graphs

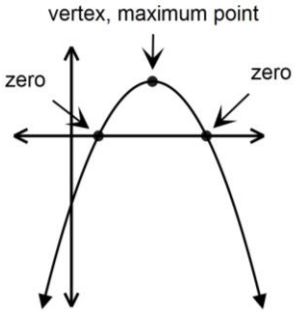
Zeros of a Function: The **values** of ***x*** that make ***f(x)*** or y equal zero. If the zeros are **real**, they tell you the places where the graph **crosses the *x*-axis**, or the ***x*-intercepts** of the graph.

Other words for zeros: *solutions to* $f(x) = 0$, *roots, x-intercepts*.

$a > 0$



$a < 0$



Finding zeros and *x*-intercepts:

1. Change y or $f(x)$ to 0.
2. Solve for x.
   - If the equation is **in factored form**, solving for x is easy – just think "What would x have to be to make each set of parentheses equal to 0?"
   - If the equation is **in standard form**, solve by factoring or by using quadratic formula
   - If the equation is **in vertex form**, get the perfect square by itself, take the square root of both sides (don't forget the ±), then solve for x.

★ **If your answers are imaginary** (negative under the square root), **the graph doesn't have *x*-intercepts.**

For each function, do the following: 1) state whether the function is in **standard**, **vertex**, or **factored** form, 2) state whether the parabola opens **up** or **down**, 3) find the **zeros** (x-values)**,** 4) state the ***x*-intercepts** as ordered pairs.

A. $f(x)=(x+7)(x-1)$

1) Form: _____

2) Direction of opening: _____

3) Zeros: _____

4) x-intercepts: _____

Show work here:

B. $y=-4x^2+2x$

1) Form: _____

2) Direction of opening: _____

3) Zeros: _____

4) x-intercepts: _____

Show work here:

C. $y=-3(x+5)^2+27$

1) Form: _____

2) Direction of opening: _____

3) Zeros: _____

4) x-intercepts: _____

Show work here:

D. $f(x)=5x^2-20$

1) Form: _____

2) Direction of opening: _____

3) Zeros: _____

4) x-intercepts: _____

Show work here:

E. $y = x^2 - 16x + 48$

1) Form: _____

2) Direction of opening: _____

3) Zeros: _____

4) x-intercepts: _____

Show work here:

F. $f(x) = 2(x-2)^2 + 8$

1) Form: _____

2) Direction of opening: _____

3) Zeros: _____

4) x-intercepts: _____

Show work here:

G. $f(x) = -(x+3)^2 + 50$

1) Form: _____

2) Direction of opening: _____

3) Zeros: _____

4) x-intercepts: _____

Show work here:

H. $y = -2x^2 + 4x - 10$

1) Form: _____

2) Direction of opening: _____

3) Zeros: _____

4) x-intercepts: _____

Show work here: