3.6 Zeros of Quadratic Functions

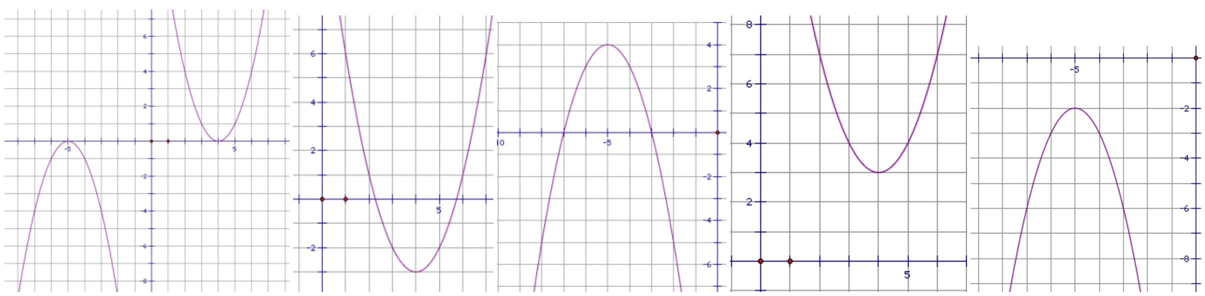
Determining the Number of Zeros

Factored Form $f(x) = a(x-r)(x-s)$

If the quadratic is expressed in factored form then there are two real roots.

Vertex Form $f(x) = a(x-h)^2 + k$

Consider the following graphs: What are the values of a? k?



One root **Two roots** **No real roots**

Summary:

$a \neq 0$ and $k = 0$	One root	
$a > 0$ and $k > 0$	No real roots	Hint: a and k are same sign
$a < 0$ and $k < 0$		
$a > 0$ and $k < 0$	Two roots	Hint: a and k are opposite signs
$a < 0$ and $k > 0$		

Standard Form $f(x) = ax^2 + bx + c$

Instead of factoring or completing the square we can look to the **quadratic formula**

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

The expression $b^2 - 4ac$ is called the DISCRIMINANT.

What happens if the discriminant is negative?

$b^2 - 4ac = 0$	One root
$b^2 - 4ac > 0$	Two real roots
$b^2 - 4ac < 0$	No real roots