

Warm Up Solve the following:

a) $3x^2 - 5x + 2 = 0$

b) $3x^2 - 5x + 2 \leq 0$

c) $3x^2 - 5x + 2 > 0$

Zeros of a Quadratic Function**1. Complete the Chart.**

Equation	Vertex	Direction of Opening	Sketch	Number of Roots
$y = -6x^2 + 9$				
$y = \frac{3}{2}x^2 - 5$				
$y = -(x-3)^2 + 17$				
$y = 5(x+2)^2 + 4$				

2. Determine the number of roots for the following:

a) $y = 6x^2 - 3x$

b) $y = 2x^2 - 16x + 32$

c) $y = -4x^2 + 49$

d) $y = x^2 - 3x + 8$

The Quadratic Formula and the Discriminant

The quantity $b^2 - 4ac$ is called the **discriminant** of the quadratic equation $ax^2 + bx + c = 0$. From it we can determine the **nature of the roots** of the equation. It can also be used in **establishing conditions so that the roots have desired properties**.

The equation $ax^2 + bx + c = 0$ has **two roots** if $b^2 - 4ac$ is _____

The equation $ax^2 + bx + c = 0$ has **one root** if $b^2 - 4ac$ is _____

The equation $ax^2 + bx + c = 0$ has **no roots** if $b^2 - 4ac$ is _____

Ex 1: Determine the **nature of the roots** for each of the following quadratic equations:

a) $x^2 + 4x + 5 = 0$

b) $3x^2 - 2x - 1 = 0$

Ex 2: Find the value(s) of k if:

a) $kx^2 + 3x - 1 = 0$ has 2 distinct roots

b) $x^2 + kx + 25 = 0$ has 1 root

c) $x^2 + kx + 25 = 0$ has 2 roots

d) $kx^2 + 12x + k = 0$ has no roots