11/28/12 The Discriminant

In the quadratic equation $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$,

b^2-4ac is called the discriminant. The discriminant tells us about what kind of roots (answers) we will have.

- If the discriminant is positive (+) then we will have two real distinct roots.
- If it's zero, (0), then we will have 1 real double root.
- If it's negative (-) then we will have 2 imaginary roots.

Determine the nature of the Roots.

Example 1 $x^2+6x+3=0$ $\quad a=1 \quad b=6 \quad c=3$

$b^2-4ac = 36-4(1)(3)$
$= 36-12$
$= 24 \rightarrow (+)$

So I will have 2 real distinct roots

Example 2 $3y^2-4y+2=0$ $\quad a=3 \quad b=-4 \quad c=2$

$b^2-4ac = 14-4(3)(2)$
$= 14-24$
$= -10 \rightarrow (-)$

So I will have 2 imaginary roots

Example 3 $12y+9=-4y^2$

$+4y^2 \quad +4y^2$

$4y^2+12y+9=0$

$a=4 \quad b=12 \quad c=9$

$b^2-4ac = 144-4(4)(9)$
$= 144-4(36)$
$= 144-144$
$= 0$

So I will have 1 real double root.

① Get into Standard form
② Calculate b^2-4ac
③ Interpret.