Name:_____ Date:_____

Pre-Calculus 11 HW 4.5 Discriminant Nature of the Roots $D = b^2 - 4ac$

1. What is a Discriminant? What is the equation for the discriminant?

2. Suppose you are given a quadratic equation in the form of $ax^2 + bx + c = 0$, where $b^2 - 4ac$ is greater than zero. How many "x" intercepts would there be? Explain:

3. What if $b^2 - 4ac$ is less than zero, how many "X" intercepts would there be? Explain:

4. What does it mean to find the "Nature of the Roots"?

5. Determine the nature of the roots [ie: Determine how many x-intercepts each quadratic equation has]

a) $x^2 + 5x + 6 = 0$	b) $12x^2 + 7x - 3 = 0$	c) $-2x^2 - 7x + 5 = 0$

d) $4x^2 = 13x - 8$	e) $x(7 - 8x) = 10$	f) $x(x + 2) = 6 - (x - 3)(2x + 1)$

6. Solve each of the following inequalities:

a) $x^2 < 16$	b) $x^2 - 25 > 0$	c) $x(3 - x) < 0$

7. Determine the value of "k" so that the equation has two equal roots:

a) $x^2 + kx + 25 = 0$	b) $kx^2 + 4x + 1 = 0$
c) $kx^2 + 4x + k + 1 = 0$	d) $0.5x^2 + 3kx + (3k - 4) = 0$

8. Determine the value of “k” so that the equation has two different roots:

a) $x^2 - kx + 12 = 0$	b) $kx^2 - kx + 1 = 0$
c) $x^2 - 4kx + (5k - 6) = 0$	c) $2x^2 - kx + (3k - 2) = 0$

9. Determine the value of “k” so that the equation has no real roots:

a) $x^2 - kx - 24 = 0$	b) $kx^2 - kx + 8 = 0$

c) $x^2 - 3kx - (3k - 8) = 0$	d) $2x^2 - 4kx - (5k - 1) = 0$

10. In order for a quadratic function to be factorable, what value must the discriminant be equal to? Explain:

11. If the quadratic equation $(x-2)^2 + k = 0$ has two distinct real roots, then what is the range of "k"? (Multiple choice, circle one) Justify your answer.

a) $k > 2$ b) $k < 0$ c) $k \leq 0$ d) $k \leq 4$