Algebra 2—H HW #_____ 5.5 & 5.6

Solve by completing the square:

1. $x^2 + x - \frac{1}{5} = 0$

2. $9x^2 - 12x + 14 = 0$

Solve using the quadratic formula:

3. $-7x^2 + 2x = -9$

4. $40x - 7x^2 = 101 - 3x^2$

5. $x^2 + 2\sqrt{3}x - 3 = 0$

6. $ix^2 - 3x - 2i = 0$

Find the value of the discriminant and determine the nature of the roots of each equation without solving the equation. Specify how many and whether the roots are real, conjugate imaginary, rational, or irrational.

5. $x^2 + 8x - 20 = 0$

6. $3x^2 = 8x + 5$

7. $x^2 - x + \frac{5}{4} = 0$

8. $x^2 + \frac{7}{3}x - 2 = 0$

9. $\sqrt{2}x^2 - \sqrt{8} = 0$

Use the discriminant to determine the real values of k for which the equation has roots of the specified nature.

10. $x^2 - 10x + k = 0$; 2 real roots

11. $kx^2 - 4x + 8 = 0$; 1 real double root

12. $kx^2 + 6x + k = 0$; 2 conjugate imaginary roots

13. *Investigation Activity*

Sketch a "quick graph" (use vertex and direction of opening) for each quadratic equation. Use the discriminant to determine the nature of the solutions for the equation when y = 0. Use your findings to determine if there is any relationship between the discriminant and the graph of a quadratic equation.

a) $y = 2x^2 + 1$

b) $y = -x^2 - 2x - 1$

c) $y = 3x^2 - 18x + 24$