Trig 4.2

Solve quadratic equations (factor, CTS, QF)*
Use the discriminant to describe roots

*Algebra 2 Ch. 6

completing the square

quadratic formula

discriminant
(nature of the roots)

conjugates

Quadratic formula song

a b c

$3x^2 - 4x + 7 = 0$

$b^2 - 4ac$

$-4 \cdot -4 - 4 \cdot 3 \cdot 7$

$16 - 84$

$\Delta = -68$

$\frac{3x^2}{3} - \frac{4x}{3} + \frac{7}{3} = \frac{0}{3}$

$x^2 - \frac{4}{3}x + \frac{4}{9} = -\frac{7}{3} + \frac{4}{9}$

$-\frac{4}{3} \cdot \frac{1}{2} = \frac{-4}{6} = -\frac{2}{3}$

$-\frac{2}{3} \cdot -\frac{2}{3}$

$\sqrt{\left(x - \frac{2}{3}\right)^2} = \sqrt{-\frac{17}{9}}$

$x - \frac{2}{3} = \pm \frac{i\sqrt{17}}{3}$

$+\frac{2}{3} \quad +\frac{2}{3}$

$x = \frac{2}{3} \pm \frac{i\sqrt{17}}{3}$

Quadratic Formula

The roots of a quadratic equation of the form $ax^2 + bx + c = 0$ with $a \neq 0$ are given by the following formula.

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

(38) $ax^2+bx+c=0$

$\frac{a}{a}\quad\frac{a}{a}\quad\frac{a}{a}\quad\frac{a}{a}$

$x^2+\left(\frac{b}{a}\right)x+\frac{b^2}{4a^2}=\left(-\frac{c}{a}\cdot\frac{4a}{4a}+\frac{b^2}{4a^2}\right)$

$\frac{b}{a}\cdot\frac{1}{2}$

$\frac{b}{2a}\cdot\frac{b}{2a}$

$\sqrt{\left(x+\frac{b}{2a}\right)^2}=\sqrt{\frac{b^2-4ac}{4a^2}}$

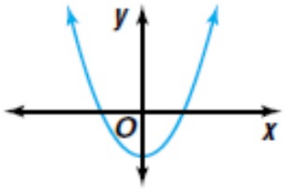
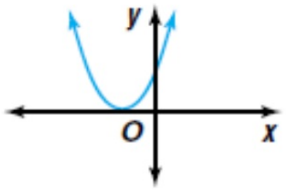
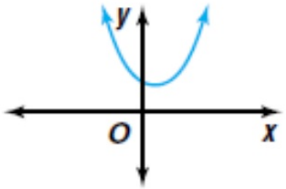
$x+\frac{b}{2a}=\pm\frac{\sqrt{b^2-4ac}}{2a}$

$-\frac{b}{2a}\quad-\frac{b}{2a}$

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

WB 4.2

Discriminant
b^2-4ac

Discriminant	Nature of Roots/Zeros	Graph
$b^2 - 4ac > 0$	two distinct real roots/zeros	
$b^2 - 4ac = 0$	exactly one real root/zero (The one real root is actually a double root.)	
$b^2 - 4ac < 0$	no real roots/zero (two distinct imaginary roots/zeros)	

Solve (whiteboards)

31. $4r^2 - r = 5$

32. $p^2 + 2p + 8 = 0$

33. $x^2 - 2x\sqrt{6} - 2 = 0$

Find the discriminant of each equation and describe the nature of the roots of the equation. Then solve the equation by using the Quadratic Formula.

7. $m^2 + 12m + 36 = 0$

8. $t^2 - 6t + 13 = 0$

Find the discriminant of each equation and describe the nature of the roots of the equation. Then solve the equation by using the Quadratic Formula.

20. $6m^2 + 7m - 3 = 0$

21. $s^2 - 5s + 9 = 0$

22. $36d^2 - 84d + 49 = 0$

23. $4x^2 - 2x + 9 = 0$