Bellwork:

solve by completing the square

$$\frac{3x^2}{3} + \frac{42x}{3} + \frac{24}{3} = \frac{0}{3}$$

$$\left(\frac{14}{2}\right)^2 \quad x^2 + 14x + 8 = 0$$

$$x^2 + 14x + \underline{49} = -8 + 49$$

$$(x+7)(x+7) \, x^2 + 14x + 49 = 41$$

$$(x+7)^2 = 41$$

$$x + 7 = \pm\sqrt{41}$$

$$\boxed{x = -7 \pm \sqrt{41}}$$

Chapter 4.8: Use the Quadratic Formula and the Discriminant

Solve for x: $\dfrac{ax^2}{a} + \dfrac{bx}{a} + \dfrac{c}{a} = \dfrac{0}{a}$

$$x^2 + \frac{b}{a}x + \frac{c}{a} = 0$$

$$-\frac{c}{a} \quad -\frac{c}{a}$$

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

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

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

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

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

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

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

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

The Quadratic Formula!!!!!!!

If $ax^2+bx+c=0$ then,

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

MUST MEMORIZE!!!!!!

ex. Solve: $x^2 + 3x = 2$

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

$a = 1 \quad b = 3 \quad c = -2$

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

$x = \dfrac{-3 \pm \sqrt{(3)^2 - 4(1)(-2)}}{2(1)}$

$x = \dfrac{-3 \pm \sqrt{9 + 8}}{2}$

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

ex. solve: $25x^2 - 18x = 12x - 9$

$-12x -12x + 9$

$25x^2 - 30x + 9 = 0$

$a = 25 \quad b = -30 \quad c = 9$

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

$$x = \frac{-(-30) \pm \sqrt{(-30)^2 - 4(25)(9)}}{2(25)}$$
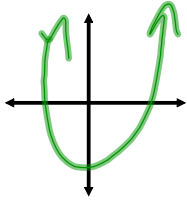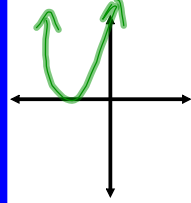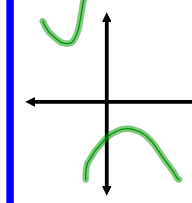
$$x = \frac{30 \pm \sqrt{900 - 900}}{50}$$

$$x = \frac{30}{50} = \boxed{\frac{3}{5}}$$

ex. Solve: $-x^2 + 4x = 5$

The Discriminant:

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

Value	>0 *positive*	0	<0 *negative*
#/type of solutions	2 real	1 real	2 imag.
Graph			

ex. Find the discriminant of the equation and give the number and type of solutions of the equation.

a. $x^2 - 8x + 17 = 0$ b. $x^2 - 8x + 16 = 0$

c. $x^2 - 8x + 15 = 0$

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

$$(-8)^2 - 4(1)(15) =$$

$$64 - 60 = 4$$

$$x = \frac{8 \pm \sqrt{4}}{2(1)}$$

$$x = \frac{8 \pm 2}{2}$$

$$x = 5, 3$$

4

ex. A juggler tosses a ball into the air. The ball leaves the juggler's hand 4ft above the ground and has an initial velocity of 40 fps. The juggler catches the ball when it falls back to a height of 3 ft. How long is the ball in the air?

$$* h = -16t^2 + v_o t + h_o$$

$$h(t) = -16t^2 + 40t + 4$$

$$3 = -16t^2 + 40t + 4$$
$$-3 \qquad\qquad\qquad -3$$

$$-16t^2 + 40t + 1$$

$$x = -.025 \quad \boxed{2.5}$$

Homework: Chapter 4.8 pg.296 #'s 3-8,13-18,31-36,52-55,70