

# 10.5 The Quadratic Formula

Recall:  $ax^2+bx+c=0$

Formula:

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

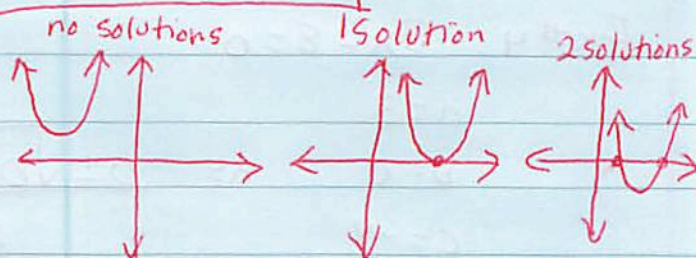
Discriminant

$$b^2 - 4ac$$

If  $D=0$ , then there is 1 solution

If  $D>0$ , then 2 solutions

If  $D<0$ , then 0 real solutions



Ex:  $x^2 - 10 + 3x = 0$

$$x^2 + 3x - 10 = 0$$

$$a=1 \quad b=3 \quad c=-10$$

$$x = \frac{-3 \pm \sqrt{3^2 - 4(1)(-10)}}{2(1)}$$

$$x = \frac{-3 \pm \sqrt{9 + 40}}{2}$$

$$x = \frac{-3 \pm \sqrt{49}}{2} = \frac{-3 \pm 7}{2}$$

Ex#2:  $x^2 - 3x - 28 = 0$

$$a=1 \quad b=-3 \quad c=-28$$

$$\boxed{\begin{array}{l} x = 2 \\ x = -5 \end{array}}$$

$$x = \frac{-(-3) \pm \sqrt{(-3)^2 - 4(1)(-28)}}{2(1)}$$

$$x = \frac{3 \pm \sqrt{9 + 112}}{2}$$

$$x = \frac{3 \pm \sqrt{121}}{2} = \frac{3 \pm 11}{2}$$

$$\boxed{\begin{array}{l} x = 7 \\ x = -4 \end{array}}$$

Ex#3: Find discriminant, how many solutions

$$4x^2 + 3x + 1 = 0$$

$$(3)^2 - 4(4)(1)$$

$$9 - 16 = -5 \quad \text{no solutions}$$

$$x^2 - 4x + 4 = 0 \quad (-4)^2 - 4(1)(4) =$$

$$16 - 16 = 0 \quad 1 \text{ solution}$$

Ex#4:  $3x^2 - 8 = 0$

$$a = 3$$

$$b = 0$$

$$c = -8$$

$$x = \frac{0 \pm \sqrt{0^2 - 4(3)(-8)}}{2(3)} = \frac{\pm \sqrt{96}}{6}$$

two options

or

$$x = \pm 1.63 \quad \pm \sqrt{96} = \frac{\pm 4\sqrt{6}}{6}$$

$$= \frac{\pm 2\sqrt{6}}{3}$$

C.W. Pg 509 (4; 5, 6)

H.W. Pg 510 (16-30)