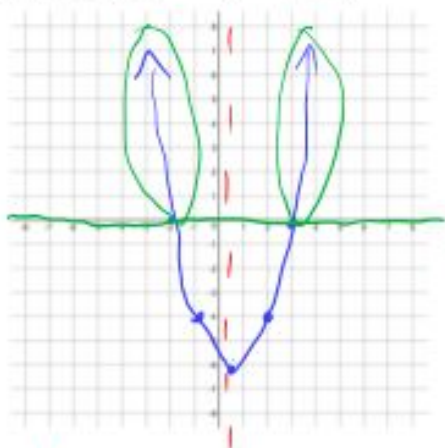**Homework:** Section 4.4 on Pg. 138 ; #2-3all
Section 4.5 on Pg. 142; #2-4, 7-15

Ex 1 Find all values of x so that: $x^2 - x > 6$

$x^2 - x - 6 > 0$ let $y = x^2 - x - 6$

$y > 0$

a) using a graph

$\boxed{\begin{array}{l} x > 3 \\ x < -2 \end{array}}$

$h = \dfrac{-b}{2a} = \dfrac{-(-1)}{2(1)} = \dfrac{1}{2} = 0.5$

$k = (0.5)^2 - 0.5 - 6 = -6.25$

$x = 2 \Rightarrow (2)^2 - 2 - 6 = -4$

$x = 3 \Rightarrow (3)^2 - 3 - 6 = 0$

b) using algebra

$x^2 - x > 6$

$x^2 - x - 6 > 0$ ← Find x-ints
(transition from ⊕ to ⊖)

$\begin{array}{c|c} \otimes -6 & (-3, 2) \\ \oplus -1 & -1 \end{array}$

$(x-3)(x+2) > 0$

$x = 3, -2$

$\boxed{\begin{array}{l} x < -2 \\ x > 3 \end{array}}$

⊕   ⊖   ⊕

same sign ① -2 same sign ② 3 same sign ③

① $\Rightarrow x = -4 \Rightarrow (-4)^2 - (-4) - 6 = 14$

② $\Rightarrow x = 0 \Rightarrow (0)^2 - (0) - 6 = -6$

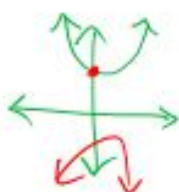③ $\Rightarrow x = 6 \Rightarrow (6)^2 - 6 - 6 = 24$

Ex 2 Find all values of x so that: $-2x^2 \geq 12 - 5x$

$0 \geq 2x^2 - 5x + 12$

$x = \dfrac{-(-5) \pm \sqrt{(-5)^2 - 4(2)(12)}}{2(2)}$

$= \dfrac{5 \pm \sqrt{25 - 96}}{4} = \dfrac{5 \pm \sqrt{-71}}{4} = $ undef
no answer

⊕

same sign everywhere $x = 0 \Rightarrow 2(0)^2 - 5(0) + 12 = 12$

NO x vals satisfy inequality

Ex 3 The height of a ball above the ground (H, in metres) thrown from a building after t seconds is given by: $H(t) = -4.9t^2 + 15.8t + 22.8$. When is the ball ~~xxxxx~~ 30m above the ground?

at most

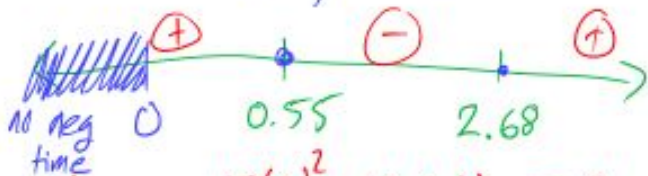$$-4.9t^2 + 15.8t + 22.8 \leq 30$$

$$-4.9t^2 + 15.8t - 7.2 \leq 0$$

$$4.9t^2 - 15.8t + 7.2 \geq 0$$

$$x = \frac{-(-15.8) \pm \sqrt{(-15.8)^2 - 4(4.9)(7.2)}}{2(4.9)}$$

$$= 0.55, \quad 2.68$$

$\boxed{\begin{array}{c} 0 \leq t \leq 0.55 \\ t \geq 2.68 \end{array}}$

no neg   0   0.55   2.68
time

$$t = 0 \Rightarrow 4.9(0)^2 - 15.8(0) + 7.2 = 7.2$$
$$t = 1 \Rightarrow 4.9(1)^2 - 15.8(1) + 7.2 = -3.7$$
$$t = 3 \Rightarrow 4.9(3)^2 - 15.8(3) + 7.2 = 3.9$$

Ex 4 Mr. G is buying green and blue highlighters for marking. The green highlighters cost $2.50 and the blue highlighters cost $2.25. He wants to buy at least 15 highlighters but needs at least 8 green highlighters. He can't spend more than $50. Write a system of inequalities to describe the situation.

$G = \#$ Green
$B = \#$ Blue

at least 15 highlighters $\Rightarrow$ $G + B \geq 15$

at least 8 Green $\Rightarrow$ $G \geq 8$

No more than $50 $\Rightarrow$ $2.5G + 2.25B \leq 50$