Name: _____ Block: ___

Pre-Calculus 11 – Unit 3 Review
Chapter 5 - Graphing Inequalities and Systems of Equations
Test Date: Friday March 29

Vocabulary Review

Vocab Word	Chinese Translation	Definition / Example
Inequality	次不等式	
Number Line	数轴	一种表示二次不等式的方法 A kind of way to represent quadratic function
Restriction	限量	Limitation， 不等式里的给出的限制
Quadratic Equation		
Linear Equation		
Dimensions	规模	指的是一个三维或者二维图形的尺寸， 需要写成长x宽x高 It means a size of a 3D or 2D shape, always write as length, width and height
Intersections	交叉	两个函数交叉 Two functions cross each other
Critical Values		

1. Solve the quadratic inequality $0 > 2x^2 + 7x + 6$

Step 1: Critical Values

$$0 > 2x^2 + 7x + 6$$
$$0 > (2x + 3)(x + 2)$$
$$\begin{cases} x_1 = -\frac{3}{2} \\ x_2 = -2 \end{cases}$$

Step 2: Intervals

❶ $x < -2$

❷ $-2 < x < -\frac{3}{2}$

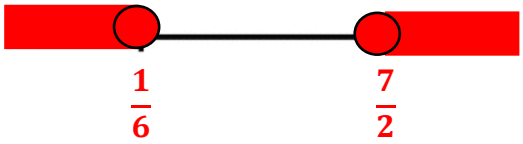
❸ $x > -\frac{3}{2}$

Step 3: Solution

Name: _____ Pre-Calculus 11 [5.1 – 5.5] Block: ____

2. Draw the inequality on the number line

a. $0 \leq 12x^2 - 44x + 7$



b. $0 \geq 2x^2 - 5x - 12$

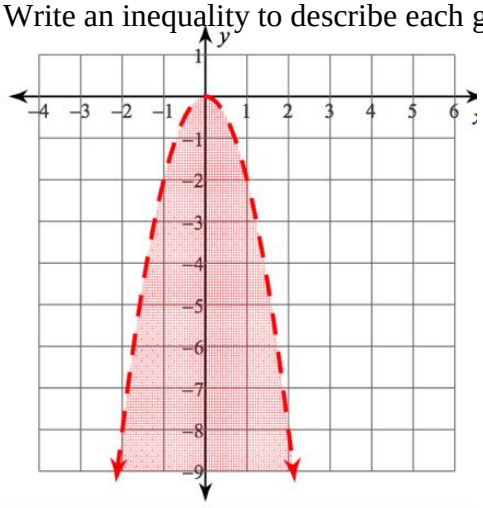
3. Is (4,6) a solution of the quadratic inequality $y \geq -2x^2 + 4x - 5$?

$$6 \geq -2(4)^2 + 4(4) - 5$$
$$6 \geq -21 \quad \text{True}$$

$\therefore$ **Yes, (4 , 6) is a solution to the inequality**

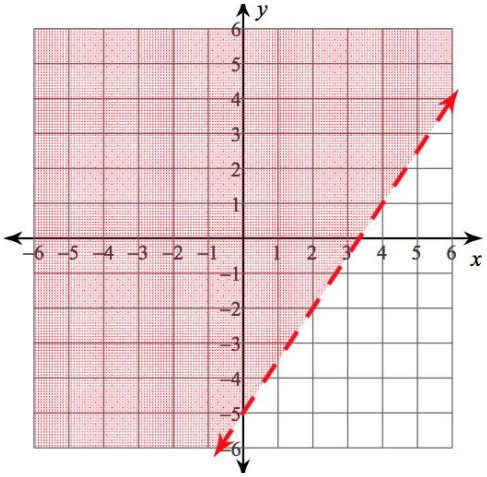
4. Write an inequality to describe each graph

a)



$y < -2x^2$

b)



$y > \frac{3}{2}x - 5$

5. Maple Leaf is building a new rectangular playground. The length of a rectangular playground is 5m greater than the width. The area must be **at least** 66m^2. Find the possible dimensions of the playground.

$$\begin{cases} L = w + 5 \\ L \times w \leq 66 \end{cases}$$

$(w + 5)w \leq 66$
$w^2 + 5w - 66 \leq 0$
$(w + 11)(w - 6) \leq 0$

$$\begin{cases} w_1 = 6 \\ w_2 = -11 \end{cases}$$

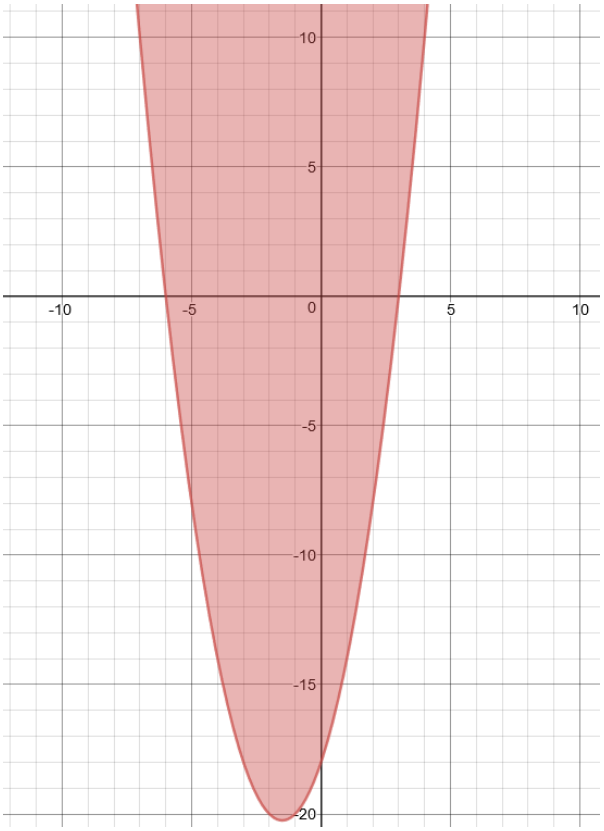
$width = 6m$
$length = w + 5 = 11m$

$\therefore$ *Possible dimensions are* $6m \times 11m$

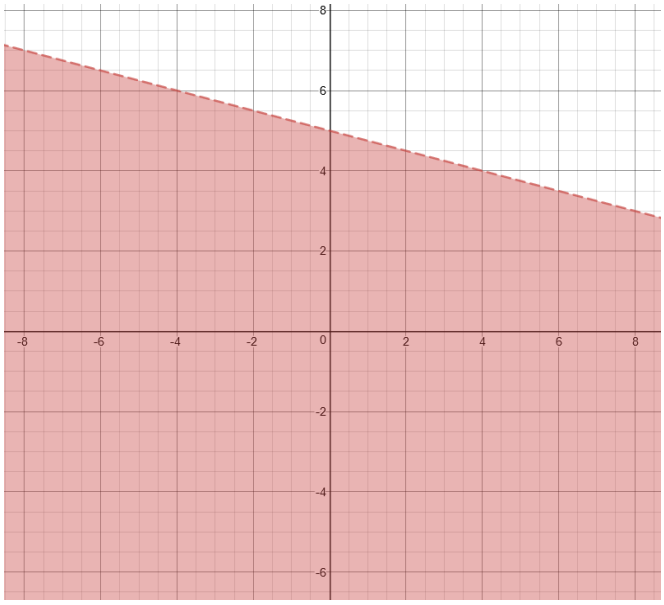
Name: _____ Pre-Calculus 11 [5.1 – 5.5] Block: ____

6. Draw the graph of the inequality

a. $y \geq x^2 + 3x - 18$

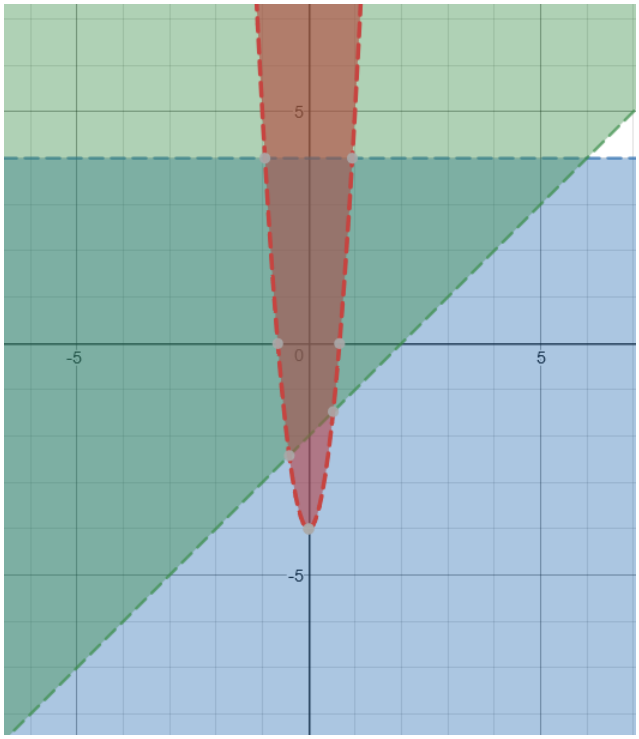


b. $\frac{1}{2}x + 2y < 10$



7. Graph the inequalities and shade the region that satisfies all the inequalities
   a. $y > 9x^2 - 4$
   b. $y < 4$
   c. $y > x - 2$

Look for the shaded region which satisfies all inequalities



Name: _____ Pre-Calculus 11 [5.1 – 5.5] Block: ____

8. Solve the following systems **algebraically**

a. Use **substitution**

$$\begin{cases} y = 2x^2 + 7x + 6 \\ y - 5x = 6 \end{cases}$$

$$\begin{cases} y = 2x^2 + 7x + 6 & ① \\ y = 5x + 6 & ② \end{cases}$$

Put ①→②

$$2x^2 + 7 + 6 = 5x + 6$$
$$2x^2 + 2 = 0$$
$$2x(x + 1) = 0$$

$$\begin{cases} x_1 = 0 \\ x_2 = -1 \end{cases}$$

Two Solutions:

$$\begin{cases} x_1 = 0 \\ y_1 = 6 \end{cases}$$

$$\begin{cases} x_2 = -1 \\ y_2 = 1 \end{cases}$$

b. Use **elimination**

$$\begin{cases} 4x - 3y = 25 \\ 8y = 3x + 10 \end{cases}$$

$$\begin{cases} 3y = 4x - 25 \xrightarrow{\times 3} 9y = 12x - 75 & ① \\ 8y = 3x + 10 \xrightarrow{\times 4} 32y = 12x + 40 & ② \end{cases}$$

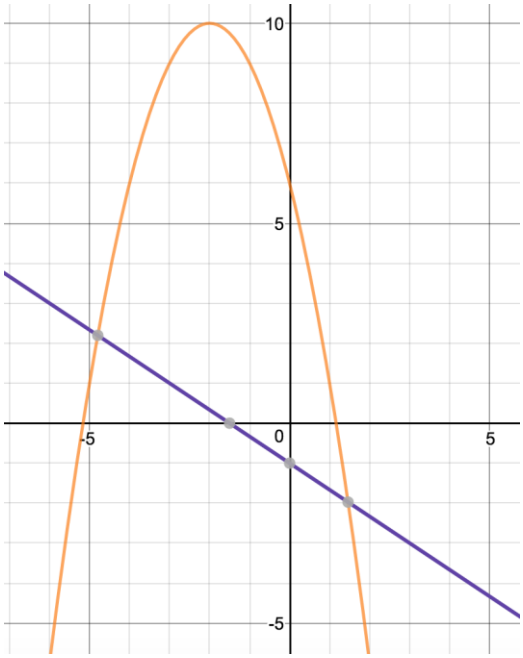
Eliminate: ② - ①

$$32y = 12x + 40$$
$$-(9y = 12x - 75)$$
$$23y = 115$$
$$\therefore y = 5$$

One Solution:

$$\begin{cases} x_1 = 10 \\ y_1 = 5 \end{cases}$$

9. Write the equation of the graph. What are the points of intersection using the graph? Verify your answer algebraically.



$$\begin{cases} y = -(x + 2)^2 + 10 \\ y = -\frac{2}{3}x - 1 \end{cases}$$

$$\begin{cases} y = -x^2 - 4x - 14 & ① \\ y = -\frac{2}{3}x - 1 & ② \end{cases}$$

Put ①→②

$$-\frac{2}{3}x - 1 = -x^2 - 4x + 6$$
$$x^2 + \frac{10}{3}x - 7 = 0$$

$$\begin{cases} x_1 = \frac{-5 + 2\sqrt{22}}{3} \\ x_2 = \frac{-5 - 2\sqrt{22}}{3} \end{cases}$$

Two Solutions:

$$\begin{cases} x_1 = \frac{-5 + 2\sqrt{22}}{3} \\ y_1 = 2.196 \end{cases}$$

$$\begin{cases} x_2 = \frac{-5 + 2\sqrt{22}}{3} \\ y_2 = -1.974 \end{cases}$$

More Review:

Textbook Review: Pg. 408 - 414

Practice Test: Pg. 415 - 418