Problem 1 – Graphing one inequality

Suppose the inequality, $y > -\frac{1}{2}x + 4$, can be used to describe a region of the United States on the US/Mexico border.

On page 1.3, graph the inequality. In the function entry line, delete the equal symbol, **=**, and then type $> -\frac{1}{2}x + 4$.

- What does the dotted line represent? Why is it dotted and not solid, in context of the inequality and in the context of the problem?

- Which side represents US territory? Mexico territory? Use the **Text** tool to label this on the graph.

- The plotted point represents a town. Drag it to the location (16, –2). At this location, is it a US or Mexican town? Is this a solution to the inequality? Why?

- Drag this point to a location that is not a solution to the inequality. What are the coordinates of this point?

Problem 2 – Graphing a system of linear inequalities

The following system of inequalities represents the fenced-in area of someone's yard. Graph the inequalities on page 2.2. To enter $\leq$ or $\geq$, press ctrl = and select the symbol.

$$\begin{cases} x \geq 0 \\ y \geq 0 \\ y \leq -x + 8 \\ y \geq 5x - 25 \end{cases}$$

- Why are the lines solid in the context of the system of inequalities? In the context of the problem?

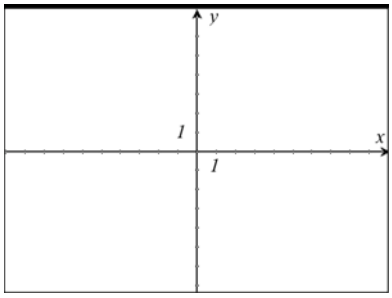
Go back to the graph and use the **Polygon** tool to show the area of the fenced-in yard. Change the attributes of the fill-in color to orange or gray. Then hide the linear inequalities.

- Suppose the owner wanted to place a post in the yard on which to hang a bird feeder. Give a point that could represent the post. What does this point represent for the system of inequalities?

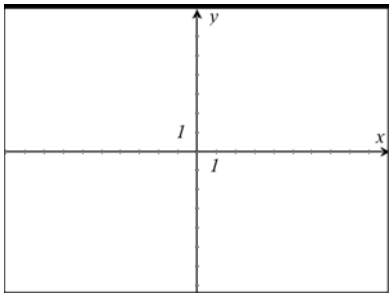
Problem 3 – Practice graphing systems of inequalities

Graph the systems of inequalities given on the Graphs & Geometry page to show the solution. Copy the graph from your handheld and shade ONLY the solution set below. Then, determine if the points on the Question page are solutions to the system.

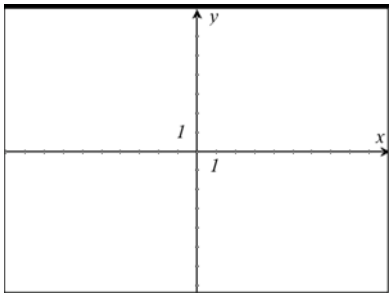
Page 3.2: $x - 5y < 18$
$2x + 3y \geq 10$



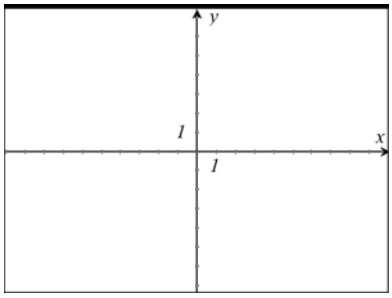
Page 3.4: $9x + 4y > -7$
$3x - 5y > -34$



Page 3.6: $4x - y \leq -11$
$4x - y \geq 7$



Page 3.8: $2y < -5x + 10$
$-x + y \geq 5$



- Explain how you know a point is in the solution set without using the graph.

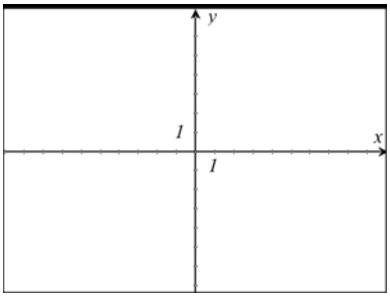
Extension – Writing systems of linear inequalities

1. On the page 4.2, an approximate map of Mississippi is shown. Write the system of inequalities whose solution graphs the state of Mississippi.

2. The Student Senate committee must consist of 6 to 9 representatives from the junior and senior classes. The committee must include at least 2 juniors and 3 seniors.

   - Write a system of inequalities to describe the situation.

   - Graph the system on page 4.4 and copy the solution of the graph here.



   - Select two possible combinations of juniors and seniors that satisfy the system.