**Systems of Linear Inequalities**

Yesterday we only dealt with a single linear inequality. Today we’re going to be dealing with systems of linear inequalities. This means we’re going to have twice the fun today as we did yesterday!

\*\* First let’s get a simple type of problem out of the way. \*\*

**Example #1**

Tell whether the ordered pair (2,1) is a solution to the system 

Just like we did yesterday, plug the x and y coordinates into each of the two equations and see if the inequality holds true.

 y < –x + 4 y  x + 1

(1) < –(2) + 4 and (1)  (2) + 1

 1 < 2 1  3

Do both inequalities hold true? Yes or No? \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Therefore the point (2,1) is a solution to the system of linear inequalities.

\*\* Now let’s move on to the actual meat of this section. Here is the series of steps you will follow for the next example problem. \*\*

***Series of Steps:***

**Step 1:** Solve each inequality for y.

**Step 2:** Graph the “boundary” lines. Use a solid line for  and use a dashed line for < or >.

**Step 3:** Shade the side of the line where the solutions belong. Shade above the line for > or  and shade below the line for < or .

**Step 4:** Identify the region where the two shaded parts overlap. This overlapping section is all the solutions that work for the system of inequalities.

\*\* (This is where it might help to have different colored pencils for shading. Or you could shade lightly and make the overlapping region more darkly shaded.) \*\*

**Example #2**

Graph the system of linear inequalities.



Step 1: Are both inequalities solved for y? Yes or No? \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Because you said no, solve the top equation for y. Rewrite what your new system of linear inequalities will look like afterwards.

Step 2: Graph both boundary lines.

Will the top inequality be a solid line or a dashed line? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Will the bottom inequality be a solid line or a dashed line? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

(Answers: Solid, Dashed)

Step 3: Decide which side of the line needs to be shaded for each inequality.

\*\* If you are unsure, choose a point on one side of the line. Take that point and plug it into the inequality. If the inequality is true, you know to shade that side of the line. If it is untrue, you will shade the other side of the line. \*\*

Step 4: Identify the region where the two shaded regions overlap.

This overlapping region is the solutions to the system of inequalities.

Come show me your graph so I know you’re on the right track!

**Assignment:** Practice B Worksheet + Practice C Worksheet