Section 4.5 Graphing Linear Inequalities

Before Class:

☐ Read the objective on page 291.

☐ Read the Helpful Hint box on page 294.

☐ Complete the exercises:

1. The definition of a linear inequality is the same as the definition of a linear equation except that the equal sign is replaced with __________________________.

2. An ordered pair is a(n) __________________________ of an inequality in $x$ and $y$ if replacing the variables by the coordinates of the ordered pair results in a true statement.

3. When graphing an inequality, make sure the test point is substituted into the __________________________.

During Class:

☐ Write your class notes. Neatly write down all examples shown as well as key terms or phrases with definitions. If not applicable or if you were absent, watch the Lecture Series (DVD) for this section and do the same (write down the examples shown as well as key terms or phrases). Insert more paper as needed.

Class Notes/Examples | Your Notes

Answers: 1) an inequality sign 2) solution 3) original inequality
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Class Notes (continued)  |  Your Notes

(Insert additional paper as needed.)
Practice:

- Complete the Vocabulary and Readiness Check on page 296.
- Next, complete any incomplete exercises below. Check and correct your work using the answers and references at the end of this section.

Review this example:
1. Graph: \(2x - y \geq 3\)

   Step 1. We graph the boundary line by graphing \(2x - y = 3\). We draw this line as a solid line because the inequality sign is \(\geq\), and thus the points on the line are solutions of \(2x - y \geq 3\).

   Step 2. \((0, 0)\) is a convenient test point since it is not on the boundary line. We substitute 0 for \(x\) and 0 for \(y\) into the original inequality.

   \[
   \begin{align*}
   2x - y & \geq 3 \\
   2(0) - 0 & \geq 3 \\
   0 & \geq 3 \quad \text{False}
   \end{align*}
   \]

   Step 3. Since the statement is false, no point in the half-plane containing \((0, 0)\) is a solution. Therefore, we shade the half-plane that does not contain \((0, 0)\). Every point in the shaded half-plane and every point on the boundary line is a solution of \(2x - y \geq 3\).

Your turn:
2. Graph the inequality: \(2x + 7y > 5\)

![Graph of 2x - y ≥ 3 and 2x - y > 3]
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Review this example:
3. Graph: \( x > 2y \)

Step 1. Find the boundary line by graphing \( x = 2y \).
The boundary line is dashed since the inequality is >.

Step 2. Use \((0, 2)\) as a test point.

\[
\begin{align*}
x > 2y \\
0 > 2(2) \\
0 > 4 \quad \text{False}
\end{align*}
\]

Step 3: Shade the half-plane that does not contain \((0, 2)\).

Your turn:
4. Graph the inequality: \( y \geq 2x \)

Next, insert your homework. Make sure you attempt all exercises asked of you and show all work, as in the exercises above. Check your answers if possible. Clearly mark any exercises you were unable to correctly complete so that you may ask questions later. DO NOT ERASE YOUR INCORRECT WORK. THIS IS HOW WE UNDERSTAND AND EXPLAIN TO YOU YOUR ERRORS.
Preparing for the Chapter 4 Test

Start preparing for your Chapter 4 Test as soon as possible. Pay careful attention to any instructor discussion about this test, especially discussion on what sections you will be responsible for, etc.

✓ Work the Chapter 4 Vocabulary Check on page 298.

✓ Read your Class Notes/Examples for each section covered on your Chapter 4 Test. Look for any unresolved questions you may have.

✓ Complete as many of the Chapter 4 Review exercises as possible (page 298). Remember, the odd answers are in the back of your text.

✓ **Most important:** Place yourself in “test” conditions (see below) and work the Chapter 4 Test (page 299) as a practice test the day before your actual test. To honestly assess how you are doing, try the following:
  - Work on a few blank sheets of paper.
  - Give yourself the same amount of time you will be given for your actual test.
  - Complete this Chapter 4 Practice Test without using your notes or your text.
  - If you have any time left after completing this practice test, check your work and try to find any errors on your own.
  - Once done, use the back of your book to check ALL answers.
  - Try to correct any errors on your own.
  - Use the Chapter Test Prep Video (CTPV) to correct any errors you were unable to correct on your own. You can find these videos in the Interactive DVD Lecture Series, in MyMathLab, and on YouTube. Search Martin-Gay MyMathLab Algebra I and click “Channels.”

I wish you the best of luck….Elayn Martin-Gay