

Homework: Set builder notation and graphing inequalities

Due Tuesday, February 1.

I. Section P2 The real line.

- A. Make sure you can do problems #9-32 on page 132. Please do not turn in your work for all of these problems.
- B. For problems #13, 17, 21 and 27 on page 132, copy out the problem onto your homework. Solve the inequality given, showing your work. Express your answer in interval notation and graph the solution set on the real line. Check your answers in the back of the book.
- C. Consider the set

$$S = \{(x, y) | ax + 1 < 3\}.$$

Write a paragraph explaining what you would do to figure out how to graph this set in the case that $a > 0$ (i.e. a is a positive number) and in the case that $a < 0$ (i.e. a is a negative number). In your paragraph, compare and contrast the process and the solution in the two cases, indicating which steps are the same for both and which ones differ. Begin your paragraph with a topic sentence to make it more coherent.

II. Section 2.4 Lines.

- A. Read Section 2.4. There's a ton of great stuff in that section.
- B. Make sure you can do problems #11-14 on page 189. Please do not turn in your work for all of these problems.
- C. For problem #12, neatly copy the graph into your homework. What is the equation for the line? Answer in a sentence, "The equation for the line is...." Referring to the line in #12, express each of the following sets in set builder notation:
 - i. S_1 is the set of all points that lie above the line.
 - ii. S_2 is the set of all points that lie on the line.
 - iii. S_3 is the set of all points that lie above or on the line.

III. Section 2.4 Lines.

- A. Make sure you can do #41-52 on page 190. Please do not turn in your work for all of these problems.
- B. Write up your solution to #46 and #50 on page 190, explaining your work, and draw the graphs on the same axes. Draw the graphs nice and big! Find the coordinates of the point where the two lines intersect, and label it on your graph. Also label all x -intercepts and y -intercepts.
- C. On a new set of axes (also nice and big!), graph the set $\{(x, y) | -3x - 5y + 30 \leq 0\}$, but instead of shading, fill the region with little + symbols. Make the border a solid line if it is included in the set and a dashed line if it is not included in the set.
- D. Add the graph of the set $\{(x, y) | x < -5\}$ to your diagram from part (??). This time instead of shading, fill the region with little \bigcirc 's. In the intersection of the two regions, use \oplus 's.

The intersection of the two regions, i.e. the region where you drew \oplus 's, is a graph of the set of points (x, y) such that the system of inequalities

$$\begin{aligned} -3x - 5y + 30 &\leq 0 \\ x &< -5 \end{aligned}$$

holds.