

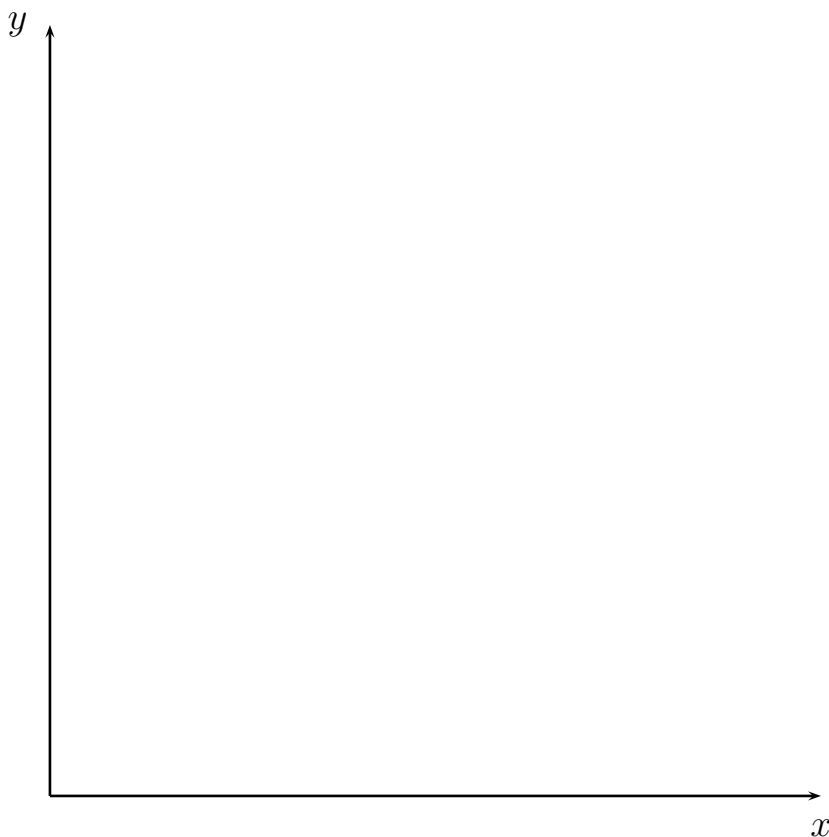
Zaine's Cyclery sell road and mountain bikes. Each road bike takes up one "space" in the shop. Because of their wider handlebars, each mountain bike takes up one and a half spaces. The shop has 150 spaces available for bikes. The wholesale price of a road bike is \$600 and mountain bikes have a wholesale price of \$450 each. Zaine wants to keep the wholesale value of his inventory at or under \$72,000. Finally, because he just doesn't like mountain bikes that much, he wants to keep at most 60 mountain bikes in stock.

1. Define two variables x and y by writing a sentence of the form "Let x be ..., and let y be ..."

2. The two usual constraints $x \geq 0$ and $y \geq 0$ hold, of course. Give all other constraints.

3. Graph the feasible region on the axes below, doing all of the following:

- Use some sort of straightedge to draw all lines.
- Label all x - and y -intercepts of lines with their values.
- Shade the feasible region **lightly**.
- Write the equation of each line next to it, or near it and with an arrow to the line.
- Give some indication in the space below and to the right how you knew how to graph each line.



4. Show algebraically how to obtain each corner point of the feasible region that is not on one or both of the axes.

5. Suppose that Zaine's shop makes a profit of \$300 from each road bike sold and \$350 from each mountain bike sold. Assuming that they turn all bikes over at the same rate, how many of each kind of bike should they stock in order to maximize his profits?

- Make a table of corner points other than $(0, 0)$ and the profit for each, **with room for one more column**. Put a header at the top of each column telling what it is!
- Conclude with a sentence that gives the shop's maximum expected profit when they have turned every bike over once, and the number of each type of bike they should stock to do this.

6. Suppose that the profit for road bikes remains the same, but the profit for mountain bikes increases to \$500 per bike. Add a column to your table from the previous exercise showing what happens. Then, in the space below, write a sentence or two telling what happens when this change occurs.