Unit 4, Lesson 5

Situations with Constraints

Let's study situations that have constraints.

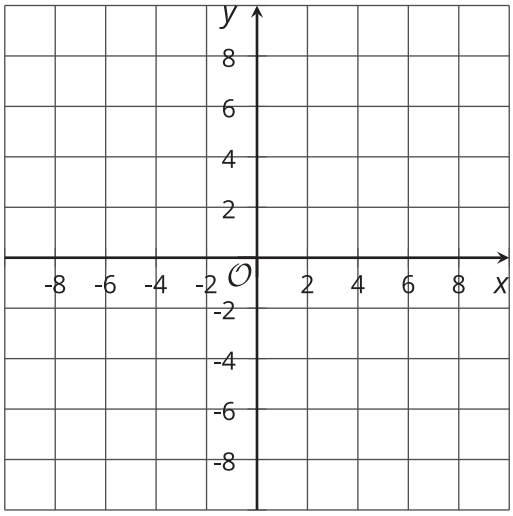
5.1 Graph Features of Inequalities

For the inequality $2x + 3y \leq 12$:

1. What is the x-intercept of the graph of its boundary line?

2. What is the y-intercept of the graph of its boundary line?

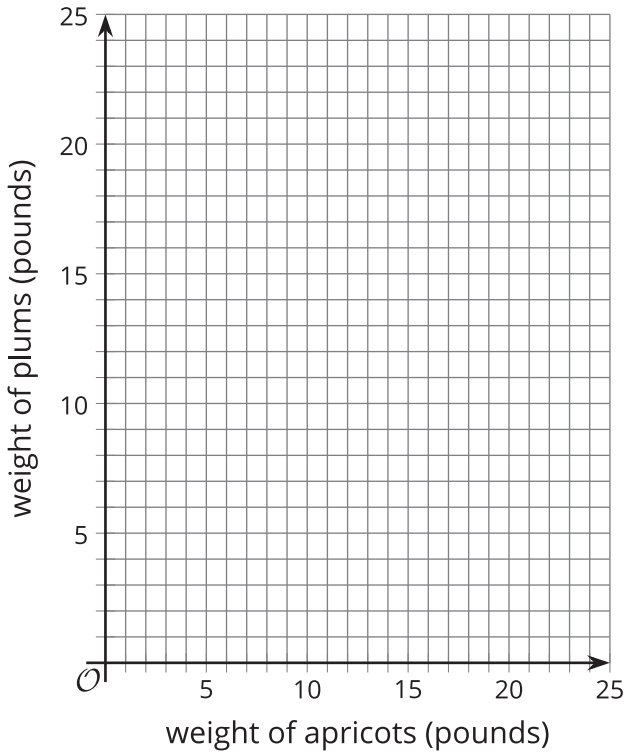
3. Plot both intercepts, and then use a ruler to graph the boundary of the inequality.



5.2 Fruits and Running

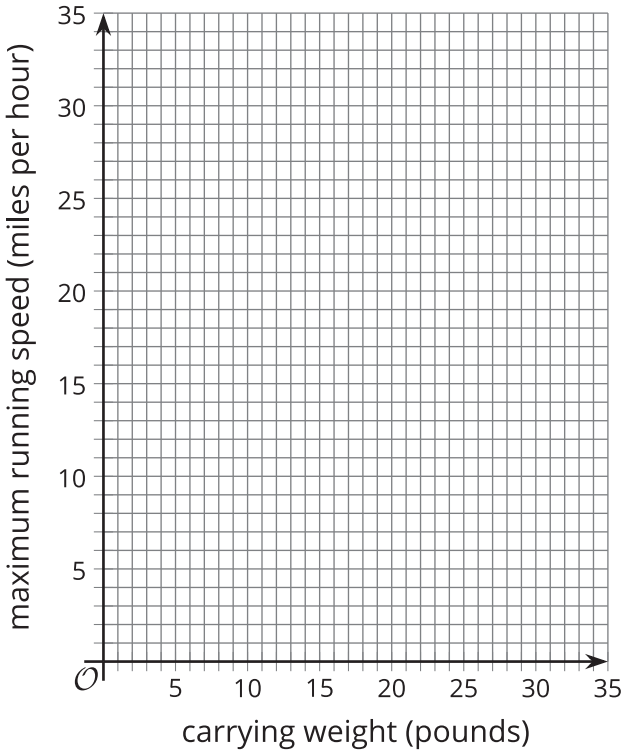
Write an equation that helps to answer the question about the situation. Then draw a graph that represents the equation.

1. Jada goes to an orchard to pick plums and apricots to make jam. She picks 20 pounds of fruit altogether. If she picks a pounds of apricots, how many pounds of plums does she pick?



   a. Consider the point $(5, 16)$. Is it possible for the weight of the fruit to be represented by that point in this situation? Explain your reasoning.

2. In a video game, a character can run at a top speed of 30 miles per hour, but each additional pound that the character carries lowers the maximum running speed by 1 mile per hour. What is the maximum running speed of a character that is carrying w pounds?



a. Consider the point $(10, 15)$. Is it possible for a character in this game to be represented by that point in this situation? Explain your reasoning.

5.3 Card Sort: Matching Graphs and Inequalities

Your teacher will give you a set of cards. Take turns with your partner to match graphs, inequalities, and constraints.

1. For each match that you find, explain to your partner how you know it's a match.
2. For each match that your partner finds, listen carefully to the explanation. If you disagree, discuss your thinking and work to reach an agreement.