

Name: \_\_\_\_\_

Date: \_\_\_\_\_

An \_\_\_\_\_ problem is a problem in which we find the greatest or least value of functions.

The system of linear inequalities has a region where all inequalities overlap. This is the \_\_\_\_\_.

To solve an optimization problem, we:

- Identify
- Define
- Describe
- Write

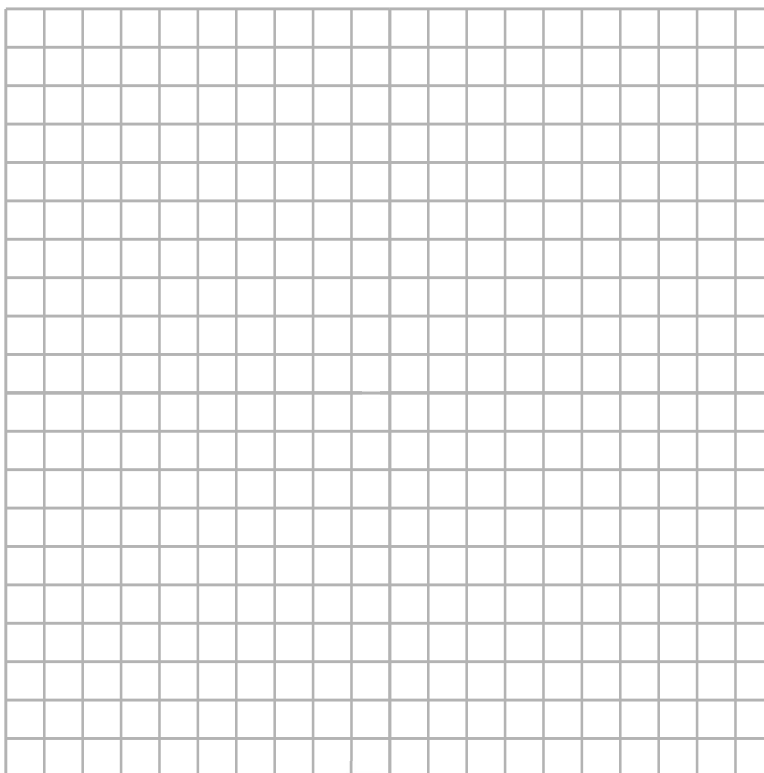
**Note**

**Example** A company does custom paint jobs on cars and trucks. Due to the size of the workshop, the company can paint a maximum of 8 cars or 5 trucks in one day. The total output for the shop cannot exceed 10 vehicles in total for one day. The company earns \$400 for a truck paint job and \$250 for a car paint job. How many of each type of vehicle should they paint in a day so that they earn the greatest profit?

**Step 1** Identify the quantity that must be optimized.

**Step 2** Define the variables that affect the quantity to be optimized and state any restrictions.

**Step 3** Write a system of linear inequalities to describe all the constraints of the problem and graph the feasible solution. Graph the feasible solution.



**Step 4** Write the objective function.

1. Find the value of the profit throughout the feasible region and note any pattern you find.
2. What happens to the profit as you move to the left of the feasible region?
3. What happens to the profit as you move from the bottom to the top of the feasible region?

4. Which point in the feasible region results in each optimal solution?
  - a. The maximum possible profit?
  - b. The minimum possible profit?

The optimal solution to the objective function is represented by: