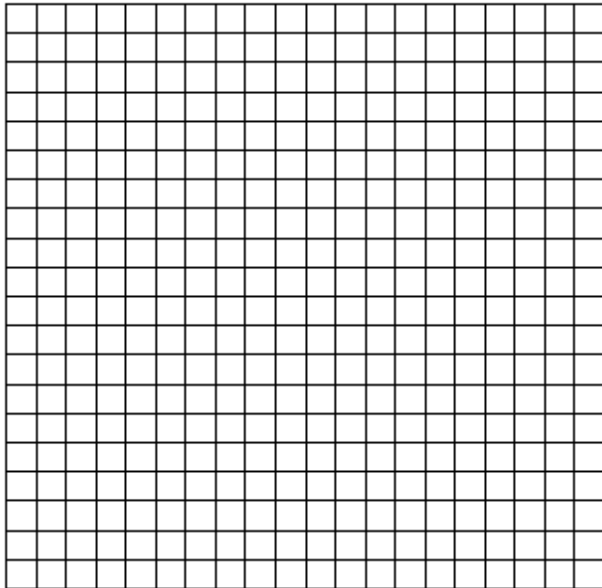


Linear Programming Word Problems

1. A manufacturer of ski clothing makes ski pants and ski jackets. The profit on a pair of ski pants is \$2.00 and on a jacket is \$1.50. Both pants and jackets require the work of sewing operators and cutters. There are 60 minutes of sewing operator time and 48 minutes of cutter time available. It takes 8 minutes to sew one pair of ski pants and 4 minutes to sew one jacket. Cutters take 4 minutes on pants and 8 minutes on a jacket. Find the maximum profit and the amount of pants and jackets to maximize the profit.

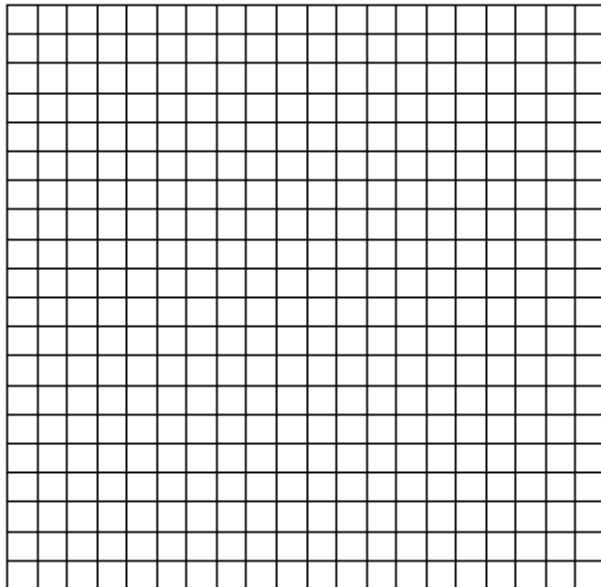
- Let x = ski pants and y = ski jackets. Since there cannot be negative pants or jackets, write two inequalities to represent that situation.
- Express the cutters' time to make pants and jackets as an inequality.
- Express the sewing operators' time to make pants and jackets as an inequality.
- Write an equation for the anticipated profit.
- Graph the constraints.



- Use the corner points to find the maximum profit.
- What is the maximum profit?
- How many ski pants and ski jackets have to be made to maximize profit?

2. The automotive plant in Rockaway makes the Topaz and the Mustang. The plant has a maximum production capacity of 1200 cars per week. During the spring, a dealer orders up to 600 Topaz cars and 800 Mustangs each week. If the profit on a Topaz is \$500 and on a Mustang it is \$800.

- a. Let $x =$ _____ $y =$ _____
Since you cannot have negative cars, write two inequalities to represent the situation.
- b. Since the plant has a capacity of 1200 cars, write an inequality to represent the situation.
- c. Since the dealer orders up to 600 Topaz and 800 Mustangs, write two inequalities to represent the situation.
- d. Write an equation for the profit.
- e. Graph the constraints.

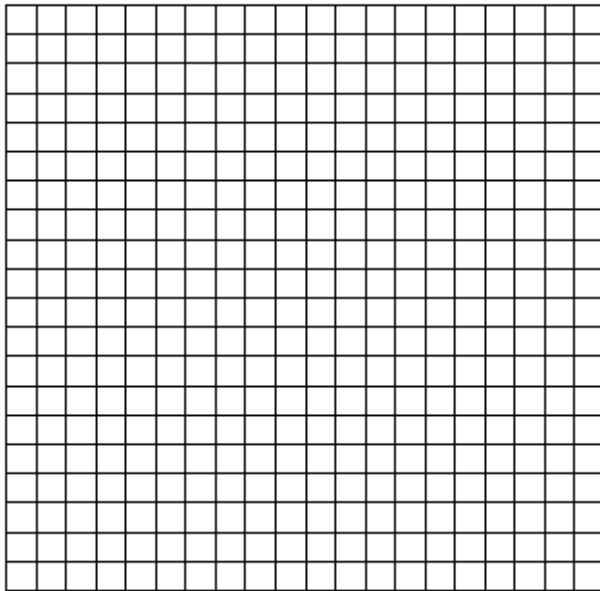


- f. Use the corner points to find maximum profit.
- g. How many types of each car are needed to maximize the profit?
- h. What is the maximum profit?

Linear Programming Word Problems cont.

3. A farmer has a field of 70 acres in which he plants potatoes and corn. The seed for potatoes costs \$20/acre, the seed for corn costs \$60/acre and the farmer has set aside \$3000 to spend on seed. The profit per acre of potatoes is \$150 and the profit for corn is \$50 an acre. Find the optimal solution for the farmer.

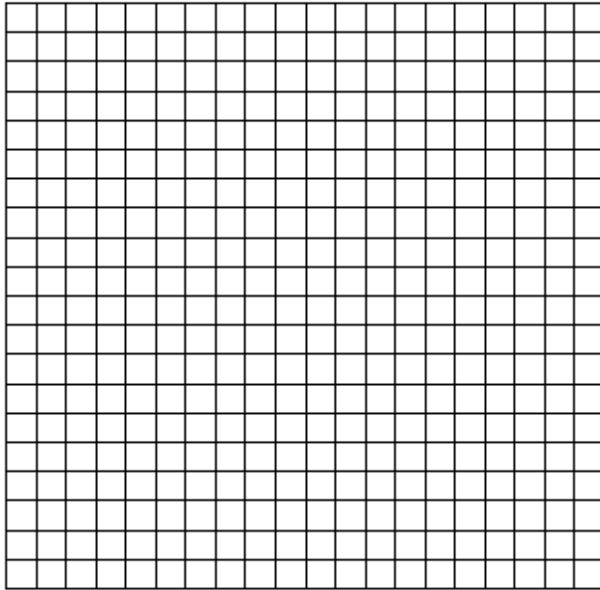
- Write the constraints for the problem.
- Write the profit equation.
- Graph the constraints and find the corner points.



- To find the **optimal solution** you are looking for the maximum. Use your corner points to find the maximum profit.
- What is the **optimal solution** (the max profit and the amount of corn and potatoes it take to get it)?

4. Impact Printing makes two kinds of computer paper using premium or ordinary quality stock. They have a contract to supply at least 5000 cases of paper. There is only enough stock to make 4000 cases of premium paper, but ample stock for ordinary paper. Both kinds are made with the same machine and 1200 hours of machine time are available. Premium paper takes 18 minutes per case to make and ordinary paper takes 12 minutes per case. The profit on each is \$4/case and \$3/case, respectively.

- a. Write the constraints for the problem. (HINT: you need to convert the hours to minutes so that the inequality has all minutes).
- b. Write the profit equation.
- c. Graph the constraints and find the corner points.



- d. **Find the optimal solution.**