

Extra Linear Programming

1. A calculator company produces a scientific calculator and a graphing calculator. Long-term projections indicate an expected demand of at least 100 scientific and 80 graphing calculators each day. Because of limitations on production capacity, no more than 200 scientific and 170 graphing calculators can be made daily. To satisfy a shipping contract, a total of at least 200 calculators must be shipped each day. If each scientific calculator sold results in a \$2 profit, and each graphing calculator produces a \$5 profit, how many of each type should be made daily to maximize net profits?

2. Consider a chocolate manufacturing company which produces only two types of chocolate, dark and milk. Both the chocolates require Milk and Choco only. To manufacture each type of chocolate the following is required:

- Each unit of dark chocolate requires 1 unit of Milk and 3 units of Choco
- Each unit of milk chocolate requires 1 unit of Milk and 2 units of Choco

The company kitchen has a total of 5 units of Milk and 12 units of Choco. The company makes a profit of \$6 per dark chocolate sold and \$5 per milk chocolate sold. How much of each chocolate should they make to maximize profit?

3. You are trying to start a new baking company but right now only know how to make 2 things! Because you are still in high school you can make at most 9 batches of chocolate chip cookies per week and 8 apple pies per week. Also your mom won't let you buy too much flour (it takes up a lot of room) so you can only use 36 cups of flour each week. Each batch of cookies uses 2 cups of flour and each apple pie uses 3 cups of flour. Each batch of cookies makes you a profit of \$6 and each apple pie makes you a profit of \$7. How many batches of cookies and apple pies should you make to maximize your profit each week?

4. Lisa has an online jewelry shop where she sells earrings and necklaces. It takes 30 minutes to make a pair of earrings and 1 hour to make a necklace, and, since Lisa is a math tutor, she only has 10 hours a week to make jewelry. In addition, she only has enough materials to make 15 total jewelry items per week. She makes a profit of \$15 on each pair of earrings and \$20 on each necklace. How many pairs of earrings and necklaces should Lisa make each week in order to maximize her profit?