

# Linear Programming Problems

Name \_\_\_\_\_

Date \_\_\_\_\_

Period \_\_\_\_\_

**Show all work on a separate piece of paper.**

1. Katie is a sales representative whose territory is Alaska and Nebraska. Her daily travel expenses average \$120 in Alaska and \$100 in Nebraska. She receives an annual travel allowance of at most \$18,000. She must spend at least 50 days in Alaska. She must spend at least 60 days in Nebraska. If sales average \$3000 per day in Alaska and \$2800 per day in Nebraska, how many days should she spend in each state to maximize sales?
2. The CHICKEN 63.8 radio station has advertising time to sell. You want to advertise a sale at your candy store. In the morning, a 60 second ad costs \$200. In the evening, a 60 second ad costs \$50. Your candy store has at most \$2200 to spend. You will run at most 20 ads. A morning ad will be heard by 90,000 people, and an evening ad will be heard by 30,000 people. You want your ads to reach the most listeners.
3. Carrie's workers make sweaters that sell for \$55 each. They also make dresses that sell for \$85 each. They can produce at most 18 finished objects per day. Each sweater requires 20 hours of labor, while a dress requires 40 hours of labor. A maximum of 600 hours of labor is available each day. Carrie needs to maximize the amount of money she takes in.
4. A manufacturer of a lightweight mountain tent makes a standard model and an expedition model. Each standard tent requires one labor hour from the cutting department and three labor hours from the assembly department. Each expedition tent requires two hours labor from the cutting department and four hours from the assembly department. The maximum labor hours available per week in the cutting and assembly departments are 32 and 84, respectively. In addition, the distributor, because of demand, will not take more than 12 expedition tents per week. If the company makes a profit of \$50 on each standard tent and \$80 on each expedition tent, how many tents of each type should be manufactured each week to maximize the weekly profit?
5. A company makes two kinds of tires: model R (regular) and model S (snow). Each tire is processed on three machines: A, B and C. Making one model R requires half an hour on machine A, two hours on B, and one hour on C. Making one model S requires one hour on A, one hour on B, and four hours on C. During the next week machine A will be available for at most 20 hours, machine B for at most 60 hours, and machine C for at most 60 hours. If the company makes a \$10 profit on each model R tire and a \$15 profit on each model S tire, about how many of each tire should be made to maximize the company's profit?