

MATH 1010 Assignment 2 Winter 2014

1. A company manufactures compact disc players and sells them for \$50 each. The fixed cost for the company to operate has been estimated at \$900,000 per year. The cost to produce each compact disc player is \$20 for labour and \$15 for material. Find a function representing the yearly profit of the company if it sells x compact disc players per year. What is the minimum number of players that the company must sell to break even?
2. Find the largest value of the function $f = 80x + 70y - 500$ considering only those values of x and y that satisfy the constraints

$$6x + 3y \leq 96, \quad y + x \leq 18, \quad 2x + 6y \leq 72, \quad y \geq 0, \quad x \geq 0.$$

3. Find the smallest value of the function $f = 21x + 14y$ considering only those values of x and y that satisfy the constraints

$$15x + 22.5y \geq 90, \quad 810x + 270y \geq 1620, \quad \frac{x}{9} + \frac{y}{3} \geq 1, \quad x \geq 0, \quad y \geq 0.$$

4. A physical fitness enthusiast decides to devote her exercise time to a combination of jogging and cycling. She wants to earn aerobic points (a measure of the benefit of the exercise to strengthening the heart and lungs) and also to achieve relaxation and enjoyment. She jogs at 6 miles per hour and cycles at 18 miles per hour. An hour of jogging earns 12 aerobic points and an hour of cycling earns 9 points. Each week she would like to earn at least 36 aerobic points, cover at least 54 miles, and cycle at least as much as she jogs. What is the minimum number of hours of exercise that she can do in order to satisfy her requirements.