MATH 1010 Assignment 2 Winter 2008

1. Suppose an art object purchased for \$60,000 is expected to appreciate in value at a constant rate of \$4000 per year. Assuming that the object's value is a linear function of the time (in years):

   (a) Find a linear equation for the problem

   (b) What would be the value of the object after 3 years?

   (c) After how many years will the value of the object be \$104,000?

2. Find the feasible set and all corner points of the region described by the following constraints and then find the maximum and minimum values of the objective function $z = x + 10y$:

$$x + 4y \geq 12$$
$$x - 2y \leq 0$$
$$2y - x \leq 6$$
$$x \leq 6$$

3. Maximize the function $P = 5x + 5y - 10$ subject to the following constraints:

$$x + y \leq 16$$
$$x + 3y \leq 36$$
$$0 \leq x \leq 10$$
$$y \geq 0$$

4. Formulate the following as a linear programming problem. Label your variables clearly, write down all the constraints and the objective function. **Set up but do not solve.**

   A 4-H club member raises geese and goats. She wants to raise no more than 16 animals, including no more than 10 geese. She spends \$15 to raise a goose and \$12 to raise a goat, and she has \$540 available for the project. Find a maximum profit she can make if each goose produces a profit of \$10 and each goat a profit of \$15.

5. Formulate the following as a linear programming problem. Label your variables clearly, write down all the constraints and the objective function. Then **solve the problem.**

   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). She jogs at 6 kilometers per hour and cycles at 18 kilometers per hour. An hour of jogging earns 12 aerobic points, and an hour of cycling earns 9 aerobic points. Each week she would like to earn at least 36 aerobic points, cover at least 54 kilometers, and cycle at least as much as she jogs. How many hours of each activity should she do each week to meet the above requirements, but minimize the total time spent working out?