Tutorial 4

Introduction to Linear Programming

1. Briefly describe what Linear Programming is.

2. Given a problem, how it is formatted in a Linear Programming model?

3. The Mapple store sells Mapple computers and printers. The computers are shipped in 12-cubic-foot boxes and printers in 8-cubic-foot boxes. The Mapple store estimates that at least 30 computers can be sold each month and that the number of computers sold will be at least 50% more than the number of printers. The computers cost the store $900 each and are sold for a profit of $1000. The printers cost $300 each and are sold for a profit of $350. The store has a storeroom that can hold 1000 cubic feet and can spend $60,000 each month on computers and printers.

   Formulate the problem a linear program model to find the maximum profit. Let x be the number of computers and y be the number of printers to be sold.

4. In order to ensure optimal health (and thus accurate test results), a lab technician needs to feed the rabbits a daily diet containing a minimum of 24 grams (g) of fat, 36 g of carbohydrates, and 4 g of protien. But the rabbits should be fed no more than five ounces of food a day.

   Rather than order rabbit food that is custom-blended, it is cheaper to order Food X and Food Y, and blend them for an optimal mix. Food X contains 8 g of fat, 12 g of carbohydrates, and 2 g of protein per ounce, and costs $0.20 per ounce. Food Y contains 12 g of fat, 12 g of carbohydrates, and 1 g of protein per ounce, at a cost of $0.30 per ounce.

   What is the optimal blend that will minimize the cost per serving?