

## HOMework SET 4

MAT 217 · FALL 2008

You must show all work to get full credit. You can use a calculator to check your work.

**Problem 1.** Maximize  $P = 20x + 15y$  subject to the following constraints

$$\begin{cases} 2x + 3y \leq 60 \\ x + 4y \leq 40 \\ x + 3y \leq 33 \\ x \geq 0, y \geq 0 \end{cases}$$

**Problem 2.** Minimize  $C = 20x + 25y$  subject to the following constraints

$$\begin{cases} 3x + y \geq 60 \\ x + y \geq 42 \\ x + 3y \geq 60 \\ x \geq 0, y \geq 0 \end{cases}$$

**Problem 3.** You have \$12,000 to invest, and three different funds from which to choose. The municipal bond fund has a 7% return, the local bank's CDs have an 8% return, and the high-risk account has an expected (hoped-for) 12% return. To minimize risk, you decide not to invest any more than \$2,000 in the high-risk account. For tax reasons, you need to invest at least three times as much in the municipal bonds as in the bank CDs. Assuming the year-end yields are as expected, what are the optimal investment amounts?

**Problem 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 protein. 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?

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*Date:* October 9, 2008 *Due Date:* Wednesday, October 15, 2008.

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