**Economics 103**

**PRACTICE EXAMS for the SECOND MIDTERM**

**Note: a typical exam would consist of three questions. The extra question is for additional practice.**

**1.** Jennifer has the following von Neumann-Morgenstern utility-of-money function:

$$U(\$x) = 200 - \left(12 - \frac{x}{1{,}000}\right)^2.$$

**(a)** What is Jennifer's attitude to risk?

**(b)** Calculate the Arrow-Pratt measure of absolute risk aversion for Jennifer's for $x$ = 4,000 and for $x$ = 6,000.

Jennifer's friend, Bob, is convinced that tomorrow it will rain while Jennifer thinks that there is a 75% probability that it will ***not*** rain. Bob is willing to take any bet and lets Jennifer name the stake. If the stake is, say, \$3000, then Bob will pay \$3000 to Jennifer if it does not rain and Jennifer will pay \$3000 to Bob if it rains. Jennifer's wealth is \$6000, and therefore she can bet any amount up to \$6000.

**(c)** According to her beliefs, what is Jennifer's expected utility if she bets \$2,000?

**(d)** According to her beliefs, what is her utility if she doesn't bet?

**(e)** How much will she bet?

**(f)** By how much does her utility go up, compared to not betting, if she bets the optimal amount?

**(g)** How much would she bet if she thought there were a 50% probability of rain? [Hint: before engaging in complex calculations, see if you can make use of one of the answers for the previous parts.]

**2.** An insurance company offers a menu of contracts of the form (h,d) where d is the deductible and h is the premium, calculated according to the following formula (where $\ell$ is the potential loss, $p$ the probability of loss and $c$ is a positive constant):

$$h = p(\ell - d) + c$$

That is, the individual chooses the deductible $d$ and then the corresponding premium is calculated according to the above formula.

**(a)** Translate the above equation into an equation in terms of wealth levels (in the wealth diagram).

**(b)** If a risk-averse individual decides to purchase insurance, will she choose a partial-insurance contract or a full insurance contract? [Fully explain your answer.]

**3.** Consider the following money lotteries:

$$L = \begin{pmatrix} \$100 & \$36 & \$25 \\ \frac{2}{5} & \frac{1}{5} & \frac{2}{5} \end{pmatrix} \qquad M = \begin{pmatrix} \$100 & \$36 & \$25 \\ \frac{1}{5} & \frac{2}{5} & \frac{2}{5} \end{pmatrix} \qquad N = \begin{pmatrix} \$100 & \$36 & \$25 \\ \frac{1}{5} & \frac{1}{10} & \frac{7}{10} \end{pmatrix}$$

For every pair $(X,Y)$ of the above lotteries state if (1) X dominates Y in the sense of first-order stochastic dominance or (2) Y dominates X in the sense of first-order stochastic dominance or (3) neither.

**4.** Consider the following money lotteries:

$$A = \begin{pmatrix} \$2 & \$6 & \$8 & \$12 \\ \frac{1}{16} & \frac{3}{16} & \frac{1}{4} & \frac{1}{2} \end{pmatrix} \qquad B = \begin{pmatrix} \$4 & \$8 & \$12 \\ \frac{1}{4} & \frac{1}{4} & \frac{1}{2} \end{pmatrix} \qquad C = \begin{pmatrix} \$4 & \$8 & \$10 & \$16 \\ \frac{1}{4} & \frac{1}{4} & \frac{1}{3} & \frac{1}{6} \end{pmatrix}$$

For every pair $(X,Y)$ of the above lotteries state if (1) X is a mean-preserving spread of Y or (2) Y is a mean-preserving spread of X or (3) neither.