Msc Micro I 2009-2010 exam. Lecturer: Todd Kaplan.

Please answer exactly 5 questions. Answer one question from each of sections: A, B, C, and D and answer one additional question from any of the sections A, B, C, or D. For instance, answering 1, 4, 6, 7, 8 is valid. Answering 1, 3, 4, 5, 7 is also valid. Answering 1,2,3,4, 5 is not valid

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Section A.

1. Show that if weak transitivity holds, then $x \succeq y$ and $y \succ z \Longrightarrow x \succ z$.

2. Show independence (and weak transitivity) implies for all L, L', L'', L''' and x, if we have $L \sim L'$ and $L'' \succeq L'''$, then we also have $xL+(1-x)L'' \succeq xL' + (1-x)L'''$.

Section B.

3. There are two firms competing in a market: A and B. There are three levels of output each firm can produce: small, medium or large. These are 10, 20, 30, respectively. Profit of firm 1 is $\pi_1(q_1, q_2) = q_1(55 - q_1 - q_2)$ and firm 2 is $\pi_2(q_1, q_2) = q_2(55 - q_1 - q_2)$. Assume they choose levels of output simultaneously. Draw the normal form game. What is the Nash equilibrium? Now assume they choose sequentially, draw the game tree. What is the subgame-perfect equilibrium?

4. Two firms are considering entering a market. A firm not entering the market earns 0. If a firm is the only firm in the market, then that firm makes 10 (million shekels). If both firms enter the market, then they earn -5 (million shekels) each. Draw the normal form game and find ALL Nash equilibria.

Section C.

5. (i) Draw the indifference curves over lotteries with three possible outcomes: 1, 2, and 3 where $u(1) = 4$, $u(2) = 2$, $u(3) = 1$, using an equilateral triangle to represent probabilities. Indicate the direction of increasing utility.

(ii) Find a $u(1)$, $u(2)$ and $u(3)$ with the same indifference curves as in part (i) but where the direction of increasing utility is reversed.

6. Silly Sam chose a sure chance of \$5000 over a 90% chance of \$6000. He also chose a 45% chance of \$6000 over a 50% chance of \$5000. Show how Silly Sam cannot have VNM expected utility. Show how by using

different weights of probability (with a $w(p)$ function) can explain his choice.

Section D.

7. Indirect utility is given by $v(p_1, p_2, m) = \frac{m}{p_1} + \frac{m}{p_2}$. What are the demands for x_1 and x_2?

8. Even Steven and odd Todd each receive a natural number, i.e., 0, 1, 2, 3, 4, ... Odd Todd prefers any odd number to an even number. Given that his number is odd (or even), he prefers a smaller numbers. Even Steven prefers any even number to any odd number. Given that his number is even (or odd), he prefers a larger number. Please give a utility function over natural numbers that represents Todd's preferences and one that represents Steven's preferences. If you wish, in your definition of the utility function you can use function $odd(n)$ which equals 1 when n is odd and 0 when n is even.