Ecn 100 - Intermediate Microeconomics
University of California - Davis April 15, 2011
Instructor: John Parman

Midterm 1

You have until 11:50am to complete this exam. Be certain to put your name, ID number and section on both the exam and your scantron sheet and fill in test form A on the scantron. Answer all multiple choice questions on your scantron sheet. Choose the single best answer for each question; if you fill in multiple answers for a question you will be marked wrong. Answer the long answer questions directly on the exam. You must show your work where relevant for full credit. Good luck!

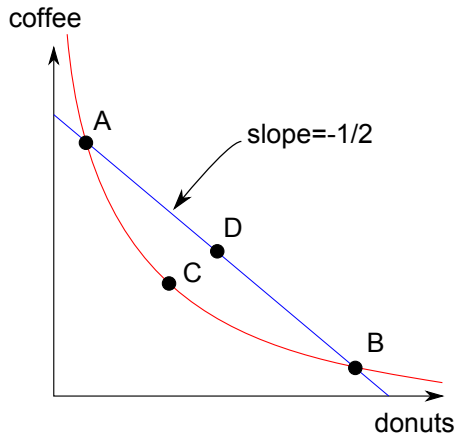
Name: **ID Number:** **Section:**

SECTION I: MULTIPLE CHOICE (60 points)

1. Suppose that Adam is indifferent between getting a bundle with four magazines and two books and a bundle with two magazines and four books. If Adam prefers a bundle with four magazines and two books to one with three magazines and three books, we could conclude that:
   (a) Adam's preferences are not monotonic.
   (b) Adam's preferences are not transitive.
   (c) Adam's preferences are not complete.
   (d) Adam's preferences are not convex.
2. On a graph with apples on the horizontal axis and oranges on the vertical axis, Bob's indifference curves are upward sloping. Which of the following statements is true?
   (a) The marginal utility of apples and the marginal utility of oranges are both positive.
   (b) Apples and oranges are both bads.
   (c) The marginal utilities of apples and oranges have opposite signs.
   (d) None of the above.
3. If two utility functions represent the same preferences, they will both lead to:
   (a) The same functions for the marginal utility of each good.
   (b) The same function for the marginal rate of substitution.
   (c) The same value for the utility of a specific bundle.
   (d) All of the above.
4. Which of the following would definitely make the set of affordable bundles larger?
   (a) Increasing the price of one good and decreasing the price of the other.
   (b) Decreasing the price of one good but leaving the price of the other good unchanged.
   (c) Increasing income and increasing the prices of both goods.
   (d) Decreasing income and decreasing the prices of both good.

5. Suppose that both candy and cigarettes are goods (rather than bads) and both exhibit diminishing marginal utility. Which of the following graphs would have a curve with a negative slope?
   (a) A graph of the marginal utility of cigarettes as a function of the number of cigarettes with marginal utility on the vertical axis cigarettes on the horizontal axis.
   (b) A graph of an indifference curve with a candy on the vertical axis and cigarettes on the horizontal axis.
   (c) Neither (a) nor (b).
   (d) Both (a) and (b).
6. Suppose goods x and y are the only two goods Carla can buy. Assuming Carla always maximizes her utility, when would she choose to not spend all of her money?
   (a) When x and y are perfect substitutes.
   (b) When one of the goods is a bad.
   (c) When her marginal rate of substitution is increasing.
   (d) When both of the goods are bads.

   Use the figure below to answer questions 7 through 9. The horizontal axis measures the number of donuts in a consumption bundle. The vertical axis measures the number of cups of coffee in a consumption bundle. The graph depicts David's budget line and his indifference curve for a utility level of 200 units. The marginal utility of coffee and the marginal utility of donuts are both positive.



7. Suppose that at his current bundle, the marginal utility of coffee is twice the marginal utility of donuts and David is spending all of his money. Which of the following bundles could David possibly be at?
   (a) Bundle A.
   (b) Bundle B.
   (c) Bundle C.
   (d) None of the above.

8. Which of the following can we say for certain?
   (a) The utility David gets from bundle A is greater than the utility he gets from bundle C.
   (b) The utility David gets from bundle C is less than 200 units.
   (c) The utility David gets from bundle D is greater than 200 units.
   (d) None of the above.

9. Assuming all of David's indifference curves have a shape similar to the one on the graph, which of the following statements is definitely true?
   (a) When moving from left to right along an indifference curve, the marginal utility of donuts is increasing.
   (b) When moving from left to right along an indifference curve, the marginal utility of donuts is decreasing.
   (c) When moving from left to right along an indifference curve, the ratio of the marginal utility of donuts to the marginal utility of coffee is increasing.
   (d) When moving from left to right along an indifference curve, the ratio of the marginal utility of donuts to the marginal utility of coffee is decreasing.

10. On a graph with shirts on the vertical axis and shoes on the horizontal axis, which of the following would make the vertical intercept of the budget line larger?
    (a) An increase in income.
    (b) An increase in the price of shirts.
    (c) A decrease in the price of shoes.
    (d) None of the above.

11. Suppose that Elizabeth consumes only goods x and y and her marginal utility from x and marginal utility from y are given by:

$$MU_x = 2y \tag{1}$$

$$MU_y = 4x \tag{2}$$

    If the price of y is \$2 and the price of x is \$4, Elizabeth's optimal bundle will contain:
    (a) Twice as much x as y.
    (b) Twice as much y as x.
    (c) Four times as much x as y.
    (d) Four times as much y as x.

12. Suppose that Frank prefers the bundle (x_a, y_a) to the bundle (x_b, y_b) and prefers the bundle (x_b, y_b) to the bundle (x_c, y_c). Which of the following statements is true?
    (a) If Frank's preferences are convex, we can say for certain that he prefers the bundle (x_a, y_a) to the bundle (x_c, y_c).
    (b) If Frank's preferences are monotonic, we can say for certain that x_a is larger than x_b.
    (c) If Frank's preferences are transitive, we can say for certain that he prefers the bundle (x_a, y_a) to the bundle (x_c, y_c).
    (d) If Frank's preferences are complete, we can say for certain that x_a is larger than x_b.

13. Suppose that Gary's consumption bundles consist of only cups of water and handfuls of sand. The marginal utility of a cup of water is always positive but diminishing as the number of cups increases. The marginal utility of a handful of sand is always zero. On a graph with cups of water on the vertical axis and handfuls of sand on the horizontal axis, Gary's indifference curves will be:
    (a) Vertical lines.
    (b) Downward sloping curves that get flatter from left to right.
    (c) Upward sloping curves that get flatter from left to right.
    (d) Horizontal lines.

14. Suppose that the price of a pen is always \$2. The price of a pencil is \$2 for each of the first 10 pencils a person buys. After that, each additional pencil costs \$1. On a graph with pencils on the vertical axis and pens on the horizontal axis, the budget line will:
    (a) Have a kink at 10 pens and will be steeper to the right of the kink than to the left of the kink.
    (b) Have a kink at 10 pens and will be flatter to the right of the kink than to the left of the kink.
    (c) Have a kink at 10 pencils and will be steeper to the right of the kink than to the left of the kink.
    (d) Have a kink at 10 pencils and will be flatter to the right of the kink than to the left of the kink.

15. Suppose that Harry always chooses the consumption bundle of apples (A) and oranges (O) that maximizes his utility. He likes both apples and oranges. His marginal rate of substitution is given by:
$$MRS = -\frac{MU_A}{MU_O} = -2\frac{O}{A} \tag{3}$$
    If the price of apples increases:
    (a) Harry will increase the number of apples he consumes.
    (b) Harry will move to a bundle on a lower indifference curve than his bundle before the price change.
    (c) Harry will have a higher utility level than before the price change.
    (d) None of the above.

SECTION II: SHORT ANSWER (40 points)

1. (15 points) Julius always consumes hot dogs (H) and buns (B) in a one to one ratio. He gets no additional utility from an extra hot dog unless he also gets an extra bun. Likewise, he gets no additional utility from an extra bun unless he also gets an extra hot dog.
   (a) Write down a utility function that represents Julius's preferences.
   (b) Suppose that the price of a hot dog is \$2 and the price of a bun is \$1. Julius has \$21 to spend. Sketch a graph with buns on the horizontal axis and hot dogs on the vertical axis that shows all of the following: Julius's budget line, Julius's optimal bundle, the indifference curve passing through Julius's optimal bundle. Be certain to label the endpoints of the budget line and the optimal bundle with their numerical values.

2. (15 points) For each scenario below, graph a set of three indifference curves consistent with the description of the person's preferences for the two goods. Be certain to clearly label the axes and to include an arrow showing the direction of increasing utility on each graph.
   (a) Kristin likes both bagels and donuts. Every additional bagel Kristin gets increases her utility by 10 units. Every additional donut Kristin gets increases her utility but by an amount less than the previous one did. Your graph should have bagels on the horizontal axis and donuts on the vertical axis.
   (b) Larry is scared of both spiders and cockroaches. Every extra spider lowers Larry's utility but but a smaller amount than the previous one did. Every extra cockroach lowers Larry's utility but by a smaller amount than the previous one did. Your graph should have spiders on the horizontal axis and cockroaches on the vertical axis.
   (c) Mark likes books. He gets the same amount of enjoyment out of a paperback as he does out of a hardback no matter how many of each he already has. Your graph should have hardbacks on the horizontal axis and paperbacks on the vertical axis.

3. (10 points) Suppose that Nancy's utility from CDs (C) and books (B) is given by the following utility function:

$$U(C, B) = C^2 B^3 \tag{4}$$

   (a) Do Nancy's preferences exhibit a diminishing marginal utility for books? Be certain to justify your answer.

   (b) Do Nancy's preferences exhibit a diminishing marignal rate of substitution? Be certain to justify your answer.