Midterm 1

You have until 4:30pm 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 for full credit. Answers may be left as fractions. Please place a box around final answers when appropriate. Good luck!

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

SECTION I: MULTIPLE CHOICE (60 points)

1. Jack's utility from chips (C) and salsa (S) is given by the function U(C,S). If $U(4,2) = 10$, $U(2,4) = 10$ and Jack has convex preferences, we can say that:

   (a) $U(3,3) \geq 10$.
   (b) $U(1,6) \geq 10$.
   (c) $U(3,3) \leq 10$.
   (d) $U(1,6) \leq 10$.

2. If bananas are an inferior, ordinary good, the the Engel curve for bananas is _____ and the demand curve for bananas is _____.

   (a) Upward sloping, downward sloping.
   (b) Upward sloping, upward sloping.
   (c) Downward sloping, upward sloping.
   (d) Downward sloping, downward sloping.

3. Currently Jill is consuming positive amounts of books and magazines. At her current level of consumption, the marginal utility of a book is 4 utils and the marginal utility of a magazine is 3 utils. If the price of a magazine is $1 and the price of a book is $3, Jill can increase her utility by:

   (a) Buying more books and fewer magazines.
   (b) Buying more magazines and fewer books.
   (c) Buying fewer books and fewer magazines.
   (d) Not enough information.

4. Consider two utility functions $U_A(x,y)$ and $U_B(x,y)$. If $U_A(x,y) = -U_B(x,y)$,

   (a) The two utility functions will represent the same preferences.
   (b) An indifference curve for U_A will have the same slope at any point (x,y) as an indifference curve for U_B.
   (c) The marginal rate of substitution for $U_A(x,y)$ will be different than the marginal rate of substitution for $U_B(x,y)$.
   (d) None of the above.

5. If we have a graph with apples on the horizontal axis and oranges on the vertical axis, an increase in the price of oranges will:

    (a) Make the budget line steeper.
    (b) Make the budget line flatter.
    (c) Make the indifference curves steeper.
    (d) Make the indifference curves flatter.

6. If we like to consume cookies and milk together and both are normal, ordinary goods, we would expect the price offer curve to be:

    (a) Upward sloping.
    (b) Downward sloping.
    (c) Horizontal.
    (d) The sign of the slope depends on which good is on the horizontal axis.

7. If we have a graph with good x on the horizontal axis and good y on the vertical axis and the indifference curves are all vertical lines, we can say that:

    (a) The marginal utility of good x is zero.
    (b) Goods x and y are perfect complements.
    (c) The marginal utility of good y is zero.
    (d) The marginal rate of substitution is diminishing.

8. Suppose utility from coffee (C) and tea (T) is given by $U(C,T) = C^2 T^{\frac{1}{2}}$. Which of the following statements are true?

    (a) The marginal utility from coffee is diminishing as the amount of coffee increases.
    (b) The marginal utility from tea is diminishing as the amount of tea increases.
    (c) (a) and (b) are both true.
    (d) Neither (a) nor (b) is true.

9. For a Giffen good, we can say for certain that the slope of the Engel curve and the slope of the demand curve:

    (a) Have the same signs.
    (b) Have opposite signs.
    (c) Get larger as the amount of the good increases.
    (d) Get smaller as the amount of the good increases.

10. Suppose that Bob has well-behaved, convex indifference curves and is currently maximizing his utility by consuming 5 donuts and 4 cups of coffee. If the price of donuts increases, what will be true of Bob's new optimal bundle of donuts and coffee:

    (a) It will contain more donuts than before and lie on a higher indifference curve.
    (b) It will contain more donuts than before and lie on a lower indifference curve.
    (c) It will contain fewer donuts than before and lie on a higher indifference curve.
    (d) It will contain fewer donuts than before and lie on a lower indifference curve.

11. A doubling of the price of goods x and y and a tripling of income will:

    (a) Shift the budget line up and rotate it.
    (b) Shift the budget line down and rotate it.
    (c) Rotate the budget line but not shift it.
    (d) None of the above.

12. Nancy's demand for apples is given by $A = \frac{I}{p_A}$ where I is income and p_A is the price of apples. Suppose she spends all of her money on apples and bananas. When the price of apples decreases:

    (a) The number of bananas consumed will increase.
    (b) The number of bananas consumed will decrease.
    (c) The number of bananas consumed will be unchanged.
    (d) The number of bananas consumed may increase or decrease.

13. Suppose that the price of of muffins is reduced once you buy at least a dozen muffins. So each muffin up to a dozen costs one price and each muffin after that is sold at a lower price. On a graph with muffins on the horizontal axis and other goods on the vertical axis:

    (a) The budget line will be kinked at twelve muffins and steeper to the right of the kink than to the left of it.
    (b) The budget line will be kinked at twelve muffins and steeper to the left of the kink than to the right of it.
    (c) The indifference curves will be kinked at twelve muffins.
    (d) The indifference curves will have a satiation point at twelve muffins.

14. If Hank's utility from goods x and y is described by the function $U(x, y) = -2x + 3y$, then:

    (a) His indifference curves are straight lines with a slope of $-\frac{2}{3}$.
    (b) His indifference curves are straight lines with a slope of $-\frac{3}{2}$.
    (c) For certain ratios of positive prices, Hank will spend all of his money on x.
    (d) None of the above.

15. On a graph of $U(y)$ with y on the horizontal axis and utility on the vertical axis, the slope of the curve is equal to:

    (a) The marginal rate of substitution.
    (b) The marginal utility of y.
    (c) The ratio of prices.
    (d) The marginal utilty of x.

16. Demand for cupcakes (C) in terms of the price of cupcakes (p_C), the price of sundaes (p_S) and income (I) is:

$$C = \frac{10I}{p_C + 10\frac{1}{p_S}}$$

Which of the following statements is true?

    (a) Cupcakes and sundaes are substitutes.
    (b) Cupcakes are an inferior good.
    (c) The Engel curve for cupcakes is downward sloping.
    (d) The demand curve for cupcakes is upward sloping.

17. If the marginal utility of hot dogs is diminishing, the we can say for certain that:

    (a) The utility from eating 10 hotdogs is less than the utility from eating 5 hotdogs.
    (b) The change in utility from eating the 10th hot dog will be smaller than the change in utility from eating the 5th hot dog.
    (c) A graph of utility as a function of hotdogs has an increasing slope.
    (d) A graph of utility as a function of hotdogs has a negative slope.

18. If Spam is an inferior, ordinary good, an increase in income will _____ while an increase in the price of Spam will _____.

    (a) Increase the quantity of Spam consumed, increase the quantity of Spam consumed.
    (b) Increase the money spent on Spam, increase the quantity of Spam consumed.
    (c) Decrease the money spent on Spam, decrease the quantity of Spam consumed.
    (d) Increase the money spent on Spam, decrease the quantity of Spam consumed.

19. If two consumers with well-behaved, convex preferences face the same prices for goods x and y but have different incomes, what will definitely be true if both consumers maximize their utility?

    (a) Both consumers will choose the same bundle.
    (b) Both consumers will have the same value for their marginal rate of substitution at their optimal bundle.
    (c) Both consumers will have the same value for their marginal utility from x and for their marginal utility from y at their optimal bundle.
    (d) Both consumers will have the same utility level.

20. If the price of one good x increases and the price of good y decreases, a consumer's utility will:

    (a) Inrease.
    (b) Decrease.
    (c) Stay the same.
    (d) Not enough information.

SECTION II: SHORT ANSWER (40 points)

For this section, be certain to show your work and clearly label any graphs you draw. Give complete answers but keep them concise. Please place a box around final answers where appropriate.

1. (6 points) Suppose that cashews are a normal, ordinary good, peanuts are a normal, ordinary good and peanuts and cashews are substitutes. On graph (a) below, show three points on the income offer curve. Include the budget lines and indifference curves that correspond to those three points. On graph (b) below, show three points on the price offer curve when the price of cashews is varied. Include the budget lines and indifference curves that correspond to those three points. Assume that the consumer has well-behaved, convex indifference curves.

cashews

(a)

peanuts

cashews

(b)

peanuts
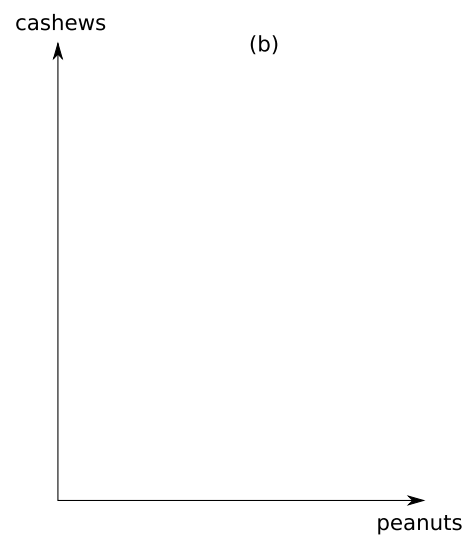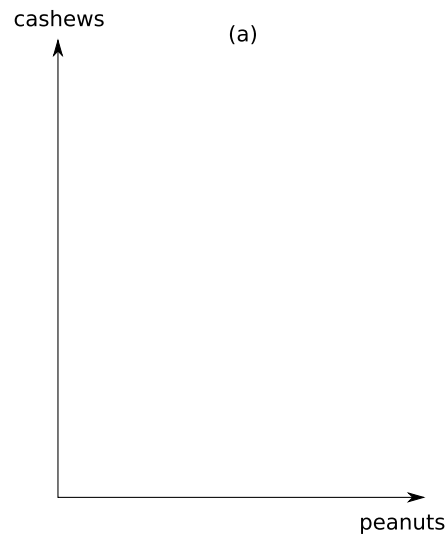
2. (20 points) Suppose that your total income is $200. Books cost $5 each. Your utility from books (B) and from all other goods (O) is given by:

$$U(B, O) = 4B + 2O$$

(a) Graph your budget constraint on a graph with books on the horizontal axis and other goods on the vertical axis. You can assume that the price of other goods, p_O, is $1. (

(b) Derive expressions for the marginal utility of books (MU_B), the marginal utility of other goods (MU_O) and the marginal rate of substitution (MRS).

(c) Find the combination of books and other goods that maximizes your utility given your budget constraint. (You can consume fractions of books and fractions of other goods.)

(d) Now suppose you are given a $50 gift card for the bookstore. The gift card can only be spent on books. Graph your new budget constraint on a graph with books on the horizontal axis and other goods on the vertical axis.

(e) Find your new optimal combination of books and other goods.

(f) By how much did the gift card increase your utility?

3. (14 points) Andy's utility from hours of tennis (T) and hours of golf (G) is given by:

$$U(T,G) = 2T^{\frac{2}{3}} + G^{\frac{2}{3}}$$

(a) Derive expressions for MU_G, MU_T and the MRS.

(b) Derive an expression for demand for hours of tennis in terms of income (I), the price of an hour of tennis (p_T) and the price of an hour of golf (p_G). In other words, derive the function $T(p_T, p_G, I)$ that gives the optimal number of hours of tennis for any set of prices and income.

(c) Based on your expression in part (b), determine whether hours of tennis are a normal or inferior good, whether they are an ordinary or Giffen good, and whether tennis and golf are substitutes.