Name: _____ Student Number: _____

ECO 2144C (Microeconomic Theory I)
Midterm Exam 1

Friday, February 14, 2014
Time to Complete the Midterm: 80 minutes

Instructions: Fill in your name and student number on every page of this questionnaire. There are 25 questions in total – 20 multiple choice, 3 true/false and 2 short answer. This midterm exam has 7 pages – check that your copy has all of them. You may use a non-programmable calculator. Good luck !!

MULTIPLE CHOICE. (40 points – 2 points per question)
Circle the letter of the choice that best completes the statement or answers the question. If you need to change your answer, very clearly cross out your previous answer, and circle and put an arrow identifying the correct answer. If the distinction between your old and new answers is not clear, no points will be awarded.

1. When two goods are substitutes, a shock that raises the price of one good causes the quantity of the other good to

   A) increase.
   B) remain unchanged.
   C) change in an unpredictable manner.
   D) decrease.

2. Suppose the demand for Digital Video Recorders (DVRs) is given by $Q = 250 - .25p + 4p_C$, where Q is the quantity of DVRs demanded (in 1000s), p is the price of a DVR, and p_C is the price of cable television. How much does the quantity demanded for DVRs change if the p rises by $40?

   A) increases by 16,000 DVRs
   B) increases by 4,000 DVRs
   C) drops by 10,000 DVRs
   D) drops by 2,500 DVRs

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3. If the demand for oranges is given by Q = 100 - 5p, then the inverse demand function is

   A) Q = 5p - 100
   B) p = 20 - .2Q
   C) p = 20 - 5Q
   D) Q = 20 - .2p

4. Consider the two demand functions:
   i) Qd = 250 - 2P.
   ii) Qd = 300 - 3P.
   Which of the two demand functions reflects a higher level of consumer income?

   A) i
   B) ii
   C) i and ii reflect the same consumer incomes.
   D) More information is needed.

5. The expression "increase in quantity supplied" is illustrated graphically as a

   A) leftward shift in the supply curve.
   B) movement up along the supply curve.
   C) movement down along the supply curve.
   D) rightward shift in the supply curve.

6. Suppose the demand curve for a good is expressed as Q = 50 - 2p. If the good currently sells for $3, then the price elasticity of demand is

   A) -3 ∗ (2/50).
   B) -3 ∗ (44/2).
   C) -2 ∗ (50/3).
   D) -2 ∗ (3/44).

7. If the price of orange juice rises 10%, and as a result the quantity demanded falls by 8%, the price elasticity of demand for orange juice is

   A) -1.25.
   B) inelastic.
   C) Both A and B above.
   D) Neither A nor B above.

8. Consumers will always pay the entire amount of a specific tax whenever

   A) demand is perfectly inelastic.
   B) supply is perfectly elastic.
   C) Both A and B above.
   D) Either A or B above but not at the same time.

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9. If a government wants to maximize revenues from a tax, it should

A) impose it on consumers.
B) impose it on sellers.
C) choose a good with a relatively elastic demand.
D) choose a good with a relatively inelastic demand.

10. It is appropriate to use the supply-and-demand model if, in a market,

A) costs of trading are low.
B) firms sell identical products.
C) everyone is a price taker with full information about the price and quality of the good.
D) All of the above.

11. If two indifference curves were to intersect at a point, this would violate the assumption of

A) completeness.
B) transitivity.
C) Both A and B above.
D) None of the above.

12. If the utility function (U) between food (F) and clothing (C) is represented as $U = \sqrt{F \times C}$, the marginal rate of substitution of clothing for food equals

A) -*F*/*C*.
B) -*C*/*F*.
C) -$\sqrt{F/C}$.
D) -$\sqrt{C/F}$.

13. The marginal rate of transformation of y for x represents

A) -P_x/P_y.
B) the rate at which the consumer must give up y to get one more x.
C) the slope of the budget constraint.
D) All of the above.

14. The consumer is in equilibrium when

A) MRT = MRS.
B) the budget line is tangent to the indifference curve at the bundle chosen.
C) $P_x/P_y = MU_x/MU_y$.
D) All of the above.

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15. A movement upward along an upward-sloping Engel curve corresponds to

A) a parallel shift in the budget constraint.
B) crossing indifference curves.
C) a rotation in the budget constraint.
D) upward-sloping indifference curves.

16. The substitution effect can be measured holding _____ constant.

A) the price of all goods
B) income
C) the price of one good
D) utility

17. The fact that consumers often react more to changes in the posted price of a good as compared to changes in the sales tax that is not posted is an example of

A) salinity.
B) rational ignorance.
C) the endowment effect.
D) salience.

18. The figure above shows Bobby's indifference map for juice and snacks. Also shown are three budget lines resulting from different prices for snacks assuming he has $20 to spend on these goods. Which of the following points are on Bobby's demand curve for snacks?

A) p = 2, q = 10
B) p = 1, q = 20
C) p = 2, q = 5
D) p = 2, q = 13

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19. If the income elasticity of potatoes is -0.7, then the income effect caused by a price decrease of potatoes

A) is less than the substitution effect.
B) tends to decrease the consumption of potatoes.
C) tends to increase the consumption of potatoes.
D) None of the above.

20. A Consumer Price Index adjustment overcompensates for inflation because it ignores

A) that some goods are inferior.
B) that the substitution effect may offset the income effect.
C) the income effect when relative prices change.
D) the substitution effect when relative prices change.

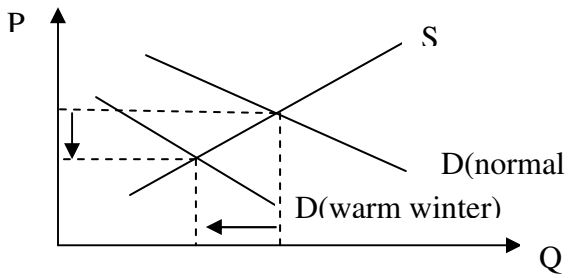
TRUE/FALSE. (10 points)
For the following, answer "True" or "False" and briefly explain why. Label and explain clearly your diagrams.

21. (2 points) The slope of the budget line represents the rate at which the consumer is willing to trade one good for another at any given bundle.

False. This describes the slope of the indifference curve. The slope of the budget line represents the rate at which the consumer can/must trade one good for another at any given bundle.

22. (4 points) During the winter of 1997-1998, eastern Canada experienced warmer than usual weather conditions. The price of home heating oil was less than it was during the previous winter, but people bought less home heating oil. This contradicts the Law of Demand.

False. The statement claiming a contradiction confuses a change in quantity demanded with a change in the demand curve. The law of demand refers to movements along a given demand curve. The mild weather caused a leftward shift of the demand curve.



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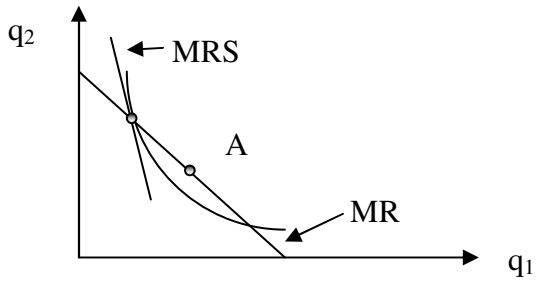
23. (4 points) If MRS > MRT, then the consumer is better off than at equilibrium.

False. MRS > MRT implies that the consumer values the next unit of "x" more than it costs to obtain it, i.e., $\frac{U_1}{p_1} > \frac{U_2}{p_2}$. That is, there is a gain from trade to be made. As more "x" is purchased, MRS falls and eventually MRS = MRT. At this point (point A in the diagram below), all gains from trade have been made.



SHORT ANSWER. (15 points)
Write your answer in the space provided. Show all your work. Label and explain clearly your diagrams.

24. (3 points) Suppose the market for potatoes can be expressed as follows:

Supply: $Q^S = -20 + 10p$
Demand: $Q^D = 400 - 20p$

Solve for the equilibrium price and quantity.

Equate the RHS of the supply equation to the RHS of the demand equation:
$-20 + 10p = 400 - 20p$.
Rearrange: $30p = 420$ or $p = 14$.
Plug this into either S or D to get Q: $Q = 400 - 20(14) = 120$.

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25. David's preferences are given by $U(q_1, q_2) = 20q_1^{.5} + q_2$.

a) (4 points) Write David's constrained optimization problem. Clearly indicate the objective function and the constraint.

$\max_{q_1,q_2} U(q_1, q_2) = 20q_1^{.5} + q_2$ s.t. $y = p_1q_1 + p_2q_2$

$U(q_1, q_2) = 20q_1^{.5} + q_2$ is the objective function

$y = p_1q_1 + p_2q_2$ is the constraint

b) (5 points) Derive the demand equations for q_1 and q_2. Assume prices and income are such that both goods are consumed in strictly positive quantities.

The marginal utility of good 1 is $U_1 = \frac{10}{q_1^{.5}}$. The marginal utility of good 2 is $U_2 = 1$.

Set MRS = MRT to solve for q_1: $10p_2 = p_1q_1^{.5}$ or $q_1 = 100\left(\frac{p_2}{p_1}\right)^2$.

Substitute q_1 into the budget constraint to solve for q_2: $y = 100p_1\left(\frac{p_2}{p_1}\right)^2 + p_2q_2$ or $q_2 = \frac{y}{p_2} - 100\frac{p_2}{p_1}$.

c) (3 points) If David's income is \$1,000, the price of good 1 is \$20 per unit, and the price of good 2 is \$10 per unit, what is David's optimal bundle?

David's optimal bundle is $q_1^* = 25$ and $q_2^* = 50$.