

**UNIVERSITY OF VICTORIA**  
**Midterm EXAM**  
**February 13, 2013**  
**Solutions Version 1**

|                               |                        |
|-------------------------------|------------------------|
| <b>Course Name &amp; No.:</b> | Economics 205          |
| <b>Sections(s):</b>           | A01                    |
| <b>CRN:</b>                   | 23303                  |
| <b>Instructor:</b>            | Betty J. Jones Johnson |
| <b>Duration:</b>              | 45 minutes             |

|                                             |
|---------------------------------------------|
| <b>NAME:</b> _____                          |
| <b>STUDENT NUMBER:</b> <u>  V00  </u> _____ |

This exam has a total of   10   pages including this cover page.

Students must count the number of pages and report any discrepancy immediately to the Invigilator.

This exam is to be answered: on the exam paper.

Marking Scheme:

Part I:

- 1) 10 marks

Part II:

- 1) 4 marks  
2) 5 marks  
3) 6 marks

Materials Allowed:

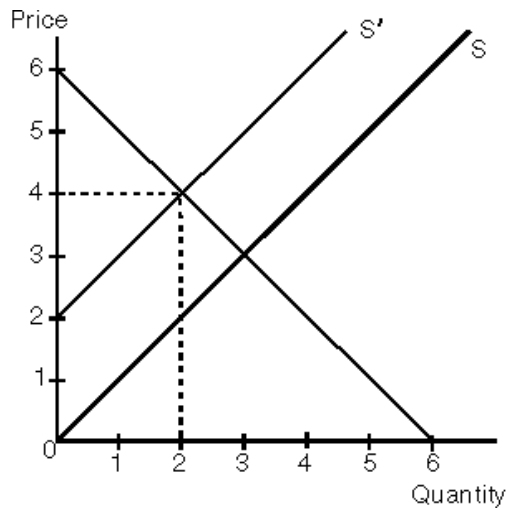
Non-programmable calculator

Answers To Multiple Choice:

| Question: | Answer: |
|-----------|---------|
| 1         |         |
| 2         |         |
| 3         |         |
| 4         |         |
| 5         |         |
| 6         |         |
| 7         |         |
| 8         |         |
| 9         |         |
| 10        |         |

Bonus:

Part 1: Reference: Graph 2-1



Refer To: Graph 2-1

1. If the supply curve is  $S'$ , then at a price of \$3/unit there will be a

- A) surplus of 1 unit.
- B) surplus of 2 units.
- C) shortage of 1 unit.
- D) shortage of 2 units.

Ans: D

2. The price of peanut butter rises due to blight, and peanut butter and jelly are complements. What happens to the equilibrium price and quantity of jelly?

- A) Equilibrium price falls, equilibrium quantity rises.
- B) Equilibrium price rises, equilibrium quantity falls.
- C) Equilibrium price falls, equilibrium quantity falls.
- D) Equilibrium price rises, equilibrium quantity rises.

Ans: C

3. Which of the following reflects a change in the quantity demanded?

- A) People buy more computers as prices fall.
- B) People buy more computers because of a surge in the economy.
- C) People buy more computers because of a change in tastes.
- D) All of the above.
- E) None of the above.

Ans: A

4. The marginal rate of substitution between two goods is

- A) the absolute value of the slope of the indifference curve.
- B) the tradeoff between the two goods under consideration at any particular point.
- C) the total utility derived at any point.
- D) all of the above.
- E) A and B.

Ans: E

5. Perfect substitutes will have indifference curves that are

- A) concave to the origin.
- B) convex to the origin.
- C) straight lines.
- D) L-shaped.
- E) horizontal or vertical.

Ans: C

6. Max U. Tillity has the utility function  $U = X^3Y$ . When X (on the horizontal axis) = 16 units and Y (on the vertical axis) = 48 units, the marginal rate of substitution of the indifference curve passing through this point is

- A) 1/9
- B) 1/3
- C) 1
- D) 3
- E) 9

Ans: E

7. The price consumption curve tells us the change in

- A) consumer equilibrium as the price of one commodity changes.
- B) a consumer's nominal income as relative prices change.
- C) prices caused by a given change in the pattern of consumption.
- D) none of the above.

Ans: A

8. Comparing the income effects of a *given* proportional increase in the prices of salt and housing,

- A) the income effect for salt will be greater.
- B) the income effect for housing will be greater.
- C) the two income effects will be precisely the same.
- D) the two income effects will be approximately the same, but will work in opposite directions.

Ans: B

9. The income elasticity of demand for an inferior good is

- A) positive and greater than 1.
- B) positive, but less than 1.
- C) negative.
- D) zero.

Ans: C

10. With a short-run production function, before diminishing returns set in,

- A) both  $MP_L$  and  $AP_L$  will have positive slopes and  $MP_L$  will lie above  $AP_L$ .
- B) both  $MP_L$  and  $AP_L$  will have positive slopes and  $AP_L$  will lie above  $MP_L$ .
- C) both  $MP_L$  and  $AP_L$  will have negative slopes and  $MP_L$  will lie above  $AP_L$ .
- D) both  $MP_L$  and  $AP_L$  will have negative slopes and  $AP_L$  will lie above  $MP_L$ .

Ans: A

**Bonus:**

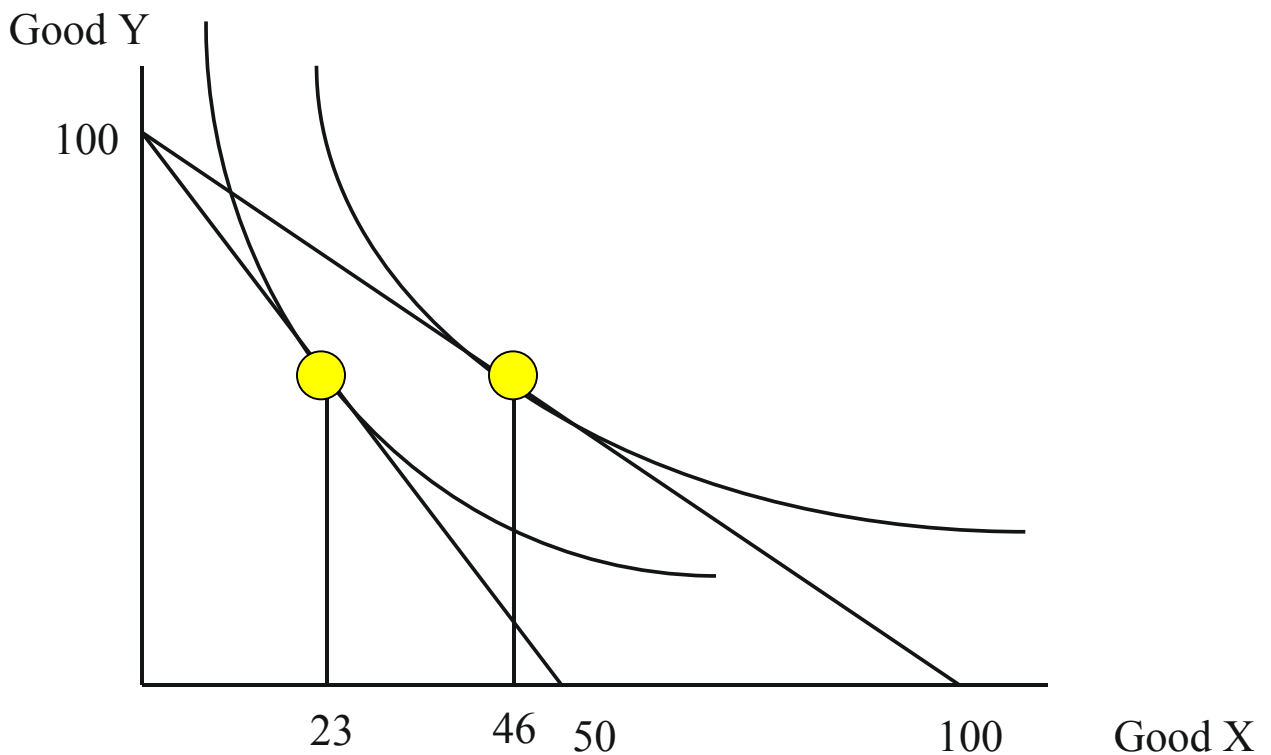
11. With L on the horizontal axis and K on the vertical axis, the MRTS of an isoquant at a given point is defined as:

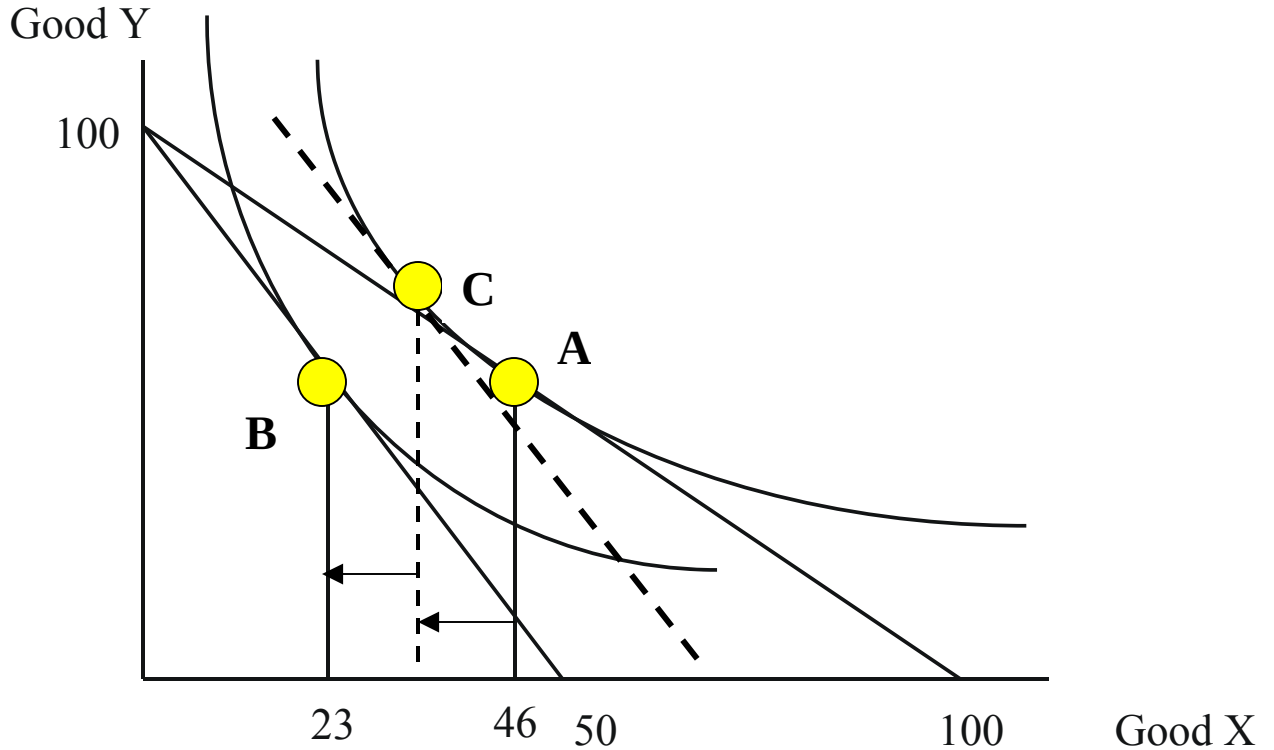
- A)  $\left| \frac{\Delta K}{\Delta L} \right|$  at the point.
- B)  $MP_L/MP_K$  at the point.
- C) both A and B.
- D) neither A nor B.

Ans: C

**Part II:**

**Question 1:** Sketch in and label the income and substitution effects of a price **increase** for good X on the diagram below. (4 Marks)





**SE: A to C**  
**IE: C to B**

**Question 2:** Determine the present value of a firm's five-year expected profit stream. (Treat all profits as being received at year-end.) Use a risk-adjusted discount rate (interest rate) of 2%  
**(5 marks)**

| Year | Expected Profit<br>(\$ millions) |
|------|----------------------------------|
| 1    | 5.0                              |
| 2    | 5.1                              |
| 3    | 6.2                              |
| 4    | 6.8                              |
| 5    | 7.2                              |

$$PV = \sum_{t=1}^5 \frac{\text{expect profit}}{(1+i)^t}$$

$$PV = \frac{5.0}{(1.02)^1} + \frac{5.1}{(1.02)^2} + \frac{6.2}{(1.02)^3} + \frac{6.8}{(1.02)^4} + \frac{7.2}{(1.02)^5}$$

$$PV = 4.9019 + 4.90196 + 5.84239 + 6.282149 + 6.521262$$

$$PV = 28.4497$$

**Question 3: (6 marks)**

The Live-For-Work, a manufacturer of vitamins, expects its 2013 demand curve for its product is

$$P=200-0.07Q,$$

where P is the price (in dollars) of vitamins, and Q is the number of packages sold per month.

- a) To sell 2000 packages per month, what price would the company have to charge? (1 mark)

$$P = 200 - 0.07Q$$

$$P = 200 - 0.07(2000)$$

$$P = 200 - 140$$

$$P = 60$$

- b) If it sets a price of \$40, how many packages will the company sell per month? (1 mark)

$$40 = 200 - 0.07Q$$

$$40 = 200 - 0.07Q$$

$$0.07Q = 160$$

$$Q = 2285.7142$$

- c) What is the price elasticity of demand if price equals \$40? (2 marks)

Using this formula:

$$\left(\frac{\partial Q}{\partial P}\right)\left(\frac{P}{Q}\right)$$

$$P = 200 - 0.07Q$$

$$0.07Q = 200 - P$$

$$Q = 2857.1429 - 14.2857P$$

$$\frac{\partial Q}{\partial P} = -14.2857$$

$$\varepsilon_d = -14.2857 \times \frac{40}{2285.7143} = -0.249999 \approx -0.25$$

- d) At what price, if any, will the demand for the company's product be of unitary elasticity?

$$(-14.2857) * P/Q = -1$$

$$14.2857\left(\frac{P}{2857.1429 - 14.2857P}\right) = 1$$

:

$$\left(\frac{P}{2857.1429 - 14.2857P}\right) = 0.07$$

$$P = 0.07(2857.1429 - 14.2857P)$$

$$P = 200 - P$$

$$2P = 200$$

$$P = 100$$

$$Q=1428.57$$

**(2 Marks)**

$$MRS_{YX} = \frac{\Delta Y}{\Delta X} \Big|_{U=\text{constant}}$$

$$PV = \frac{\text{Future Value}}{(1+i)^t}$$

$$\varepsilon_d = \frac{\frac{\Delta Q}{Q}}{\frac{\Delta P}{P}} = \frac{\Delta Q}{\Delta P} \times \frac{P}{Q} = \frac{\partial Q}{\partial P} \times \frac{P}{Q} \quad \Leftarrow \text{Point Elasticity of Demand}$$

$$\varepsilon_d = \frac{\frac{\Delta Q}{(Q_1 + Q_2)/2}}{\frac{\Delta P}{(P_1 + P_2)/2}} = \frac{\Delta Q}{\Delta P} \bullet \frac{P_1 + P_2}{Q_1 + Q_2} \quad \Leftarrow \text{Arc Elasticity of Demand}$$

$$\varepsilon_s = \frac{\frac{\Delta Q}{Q}}{\frac{\Delta P}{P}} = \frac{\Delta Q}{\Delta P} \bullet \frac{P}{Q} \quad \Leftarrow \text{Point Price Elasticity of Supply}$$

$$\varepsilon_s = \frac{\frac{\Delta Q}{(Q_1 + Q_2)/2}}{\frac{\Delta P}{(P_1 + P_2)/2}} = \frac{\Delta Q}{\Delta P} \bullet \frac{P_1 + P_2}{Q_1 + Q_2} \quad \Leftarrow \text{Arc Price Elasticity of Supply}$$

$$\varepsilon_M = \frac{\frac{\Delta X}{(X_0 + X_1)/2}}{\frac{\Delta \text{Income}}{(M_0 + M_1)/2}} = \frac{\Delta X}{\Delta M} \bullet \frac{(M_0 + M_1)}{(X_0 + X_1)} \quad \text{Arc Income elasticity of demand}$$

$$\varepsilon_M = \frac{\partial X}{\partial M} \bullet \frac{(M)}{(X)} \quad \text{Income elasticity of demand}$$

$$\left( \frac{\Delta X}{\Delta P} \right) = \frac{\Delta X}{\Delta P} \Big|_{U=c} - X \left( \frac{\Delta X}{\Delta I} \right) \quad \text{Slutsky Equation}$$

$$E_{BP_A} = \frac{\Delta B}{\Delta P_A} \bullet \frac{P_A^1 + P_A^2}{B_1 + B_2} \quad \Leftarrow \text{Arc Cross Price Elasticity of Demand}$$

$$Y = \frac{M}{P_Y} - \frac{P_X}{P_Y} X \quad \Leftarrow \text{budget constraint}$$

$$MRTS_{KL} = \frac{\Delta K}{\Delta L} \Big|_{q=\text{constant}}$$

$$q = AL^a K^b$$

$$K = \frac{C}{r} - \frac{w}{r} L \quad \Leftarrow \text{Isocost Line} \quad MRTS_{KL} \equiv \frac{\Delta K}{\Delta L} = - \frac{MP_L}{MP_K}$$