Econ 311 - Intermediate Microeconomics

Midterm Exam

University of Oregon

April 30, 2025

Version 1

Give every question your best shot.
Never back down. Never what?
Never Give Up.

Name: Answer Key 95#: _____

You have a total of 1h 50min (110 minutes) to complete the exam.
The only items allowed on your desk at any time are pens/pencils, scratch paper, a 3x5 note card, and a calculator. Everything else must be stored in your bag underneath your desk.
If you need to use the bathroom during the exam, leave your phone on the table in the front of the classroom. Please wait until there are no phones currently on the table before you go to the bathroom.
Any form of cheating will result on a zero on the exam.

There are three sections to be completed:

- Multiple Choice: 10 Questions
- Short-Answer Questions: 4 Questions
- Multi-Part Analysis Questions: 2 Questions

Point totals and question specific instructions are listed for each section. Please ask for clarification if a question is not clear to you.

The exam is a total of 8 pages. Please verify you have all 8 in your exam. If you do not, let me know immediately.

Multiple Choice

Question 1. (3 P.)
Choose the MRS for the utility function $U(x, y) = 3x + 2y + 10$:

a) 10/3
b) 2/10
c) $\frac{3}{2} + 10$
d) 3/2

Question 2. (3 P.)
For the utility function $U(x, y) = x^{1/2}y^{1/2}$, which of the following bundles would place you on the same indifference curve as the bundle $(x = 4, y = 4)$?

a) $(1, 16)$
b) $(8, 8)$
c) $(1/2, 4)$
d) $(4, 12)$

Question 3. (3 P.)
The units of the MRS are in _____.

a) Dollars
b) Utils
c) Quantity of good y per unit of good x
d) Dollars per quantity of x

Question 4. (3 P.)
If x is a **good** and y is a **bad**, then on the (x, y) plane, moving in which direction represents moving to **more preferred** bundles?

a) Down, Left
b) Down, Right
c) Up, Left
d) Up, Right

Question 5. (3 P.)
Assuming we are not at a corner solution and the consumer is already using all of their budget, if $\frac{MU_x}{p_x} > \frac{MU_y}{p_y}$, what does this tell us?

a) They should consume more of x and less of y
b) They should consume more of y and less of x
c) They are maximizing their utility
d) They should consume more of both x and y

Version 1

1: d
2: a
3: c
4: b
5: a

Version 2

1: a
2: b
3: a
4: c
5: b

Question 6. (3 P.)
The price elasticity of demand, ϵ_{x^*,p_x}, should always be:

a) Less than one
b) Positive
c) Negative
d) Greater than one

Question 7. (3 P.)
The sign of the Engel Curve's slope...

a) will always be postitive
b) depends on the cross-price elasticity of the good
c) will always be zero
d) depends on whether the good is normal or inferior

Question 8. (3 P.)
Which of the following would cause the demand curve to shift **outward**?

a) Increase in consumer incomes
b) Decrease in the price of a substitute good
c) Decrease in the good's own price
d) Increase in consumer incomes

Question 9. (3 P.)
Suppose a consumer is indifferent between the bundles $(x = 3, y = 1)$, and $(x = 1, y = 3)$. If their preferences satisfy (strict) *concavity* and *more is better*, what can we say about their preference for the bundle $(x = 2, y = 2)$?

a) $(1, 3)$ is preferred to $(2, 2)$
b) $(2, 2)$ is preferred to $(3, 1)$
c) They are indifferent between $(2, 2)$ and $(3, 1)$
d) There is not enough information to say anything about $(2, 2)$

Question 10. (3 P.)
A decrease in the price of good x will _____ the maximum possible consumption of x and _____ the maximum possible consumption of y.

a) increase : leave unchanged
b) decrease : leave unchanged
c) leave unchanged : increase
d) leave unchanged : decrease

Version 1

6: c
7: d
8: typo. give full credit
9: b
10: a

Version 2

6: d
7: c
8: typo. give full credit
9: a
10: c

Short Answer

Question 11. (6 P.)
Market research has revealed that the Netflix's target consumer has the following preferences over potential broadcasting bundles which consist of two hit shows: seasons of *Squid Game* (*SG*) and seasons of *Stranger Things* (*ST*).

- {1 *SG*, 3 *ST*} is preferred to {2 *SG*, 2 *ST*}
- {2 *SG*, 2 *ST*} is preferred to {3 *SG*, 1 *ST*}

A B A ≻ B
B C B ≻ C

Would this consumer rather watch {**1 season** of *Squid Game* and **3 seasons** of *Stranger Things*} or {**3 seasons** of *Squid Game* and **1 season** of *Stranger Things*}?
Justify your answer.

By transitivity A ≻ C
so
1 SG, 3 ST is preffered

+3 justification (could also mention more is better, monotonicity, completeness)

+3 correct answer

Question 12. (8 P.)
Consider my preferences for sandwich ingredients; slices of bread (b) and chicken tenders (c).
Suppose that each sandwich requires exactly two slices of bread and one chicken tender. I get no utility from any leftover ingredients which are not included in a whole sandwich (open face sandwiches don't count as sandwiches).
Create a utility function that models my preferences for bread and chicken ($U(b, c)$).
What must be true of any bundle that maximizes my utility when my budget for these ingredients is constrained?

- $U(b,c) = \min\{c, 2b\}$

+2 for writing any utility function with two variables

+2 for a min fn (values could be scaled up/down e.g., $\min\{\frac{1}{2}c, 1b\}$ or $\min\{2c, 4b\}$)

- No Waste Condition:

$2b = c$
or consume twice as much bread as chicken

+4 for correct ratio (give partial credit if numbers switched) i.e., $b = 2c$

Question 13. (8 P.)

Suppose the demand function for x is $x^*(M, p_x, p_y) = M - 3p_x - 2p_y$, and that $M = 19$, $p_x = 1$, $p_y = 2$. Solve for the own price elasticity of demand for x (ϵ_{x^*,p_x}). Is this *elastic*, *inelastic*, or *unit elastic*? Show all work. Leave your answer as a simplified fraction.

+2 correct formula
+2 partial derivative
+2 correct fraction
+2 elastic/inelastic matches their fraction

$$\varepsilon_{x^*,p_x} = \frac{\partial x^*}{\partial p_x} \cdot \frac{p_x}{x^*} = -3 \cdot \frac{p_x}{x^*}$$

$$= \frac{-3p_x}{M - 3p_x - 2p_y} = \begin{cases} V1: \dfrac{-3(1)}{19-3(1)-2(2)} = \boxed{-\dfrac{1}{4}} \\ V2: \dfrac{-3(2)}{24-3(2)-2(1)} = \boxed{-\dfrac{3}{8}} \end{cases}$$

$|\varepsilon_{x^*,p_x}| < 1$ so inelastic

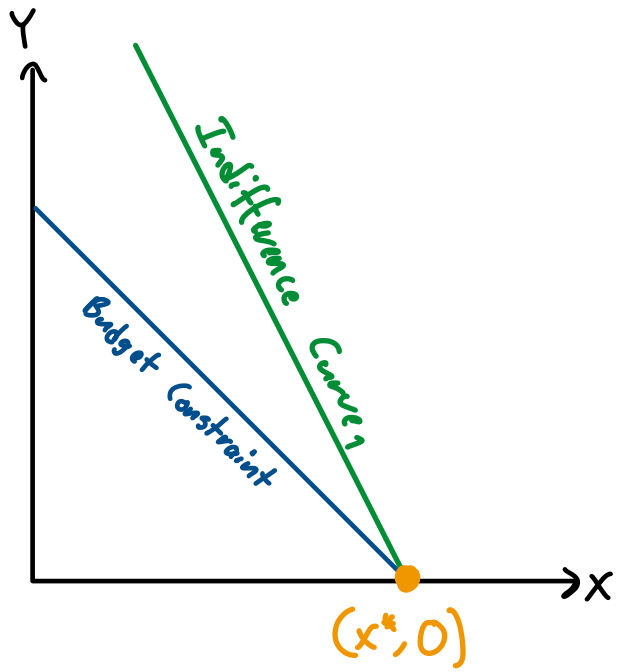
Question 14. (8 P.)

Illustrate a potential utility maximizing consumption bundle for *perfect substitutes* in each of the following cases:

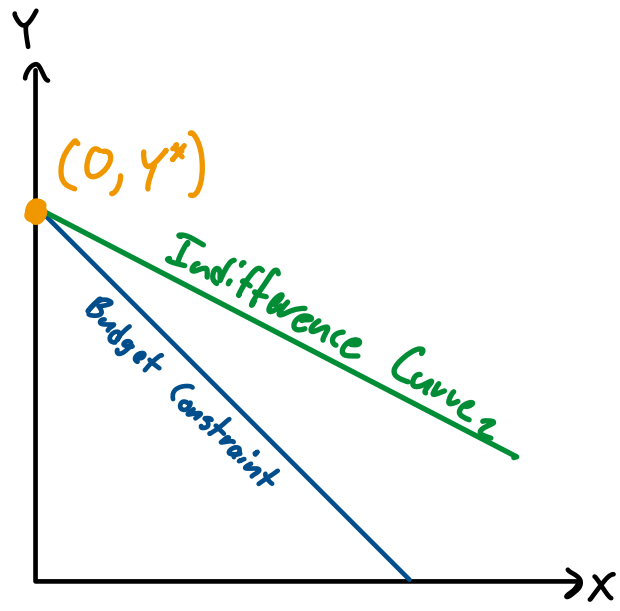
1. MRS > Price Ratio
2. MRS < Price Ratio

Carefully label your axes, indifference curves, budget constraints, and your consumption bundles.

1. MRS > PR



2. MRS < PR



+4 for slope of IC being steeper/flatter than BC depending on case and axes
+2 for showing optimal bundles in correct locations
+2 for everything labelled

Version 2: everything will be switched R ↔ B

Long Answer

Question 15. (25 P.)
Jose's utility function for bundles of Rice, R, and Beans, B, is:

$$U(R,B) = R^{1/4}B^{3/4}$$

a) (5 P.) Set up Jose's utility maximization problem and derive the optimality condition. Keep prices and income as variables for now.

- $\max U = R^{1/4}B^{3/4}$
  subject to $M = P_R R + P_B B$
- optimality condition: $MRS = \frac{P_R}{P_B}$
- $MRS = \frac{MU_R}{MU_B} = \frac{\frac{1}{4}R^{-3/4}B^{3/4}}{\frac{3}{4}R^{1/4}B^{-1/4}}$

(optional to simplify:) $\frac{1B}{3R} = \frac{P_R}{P_B}$

+1 budget constraint (can pick any price vars)
+2 Something that looks like MRS=PR
+2 correctly take derivatives for MU

b) (5 P.) Suppose that Jose only has \$8 to allocate between Rice and Beans and that the price of both Rice and Beans is equal to \$1. How many units of each good will Jose consume?

- price ratio $= 1/1 = 1$
  so from optimality condition: $B = 3R$
- plug into budget constraint:

$$8 = 1\cdot R + 1\cdot B$$
$$= R + 3R$$

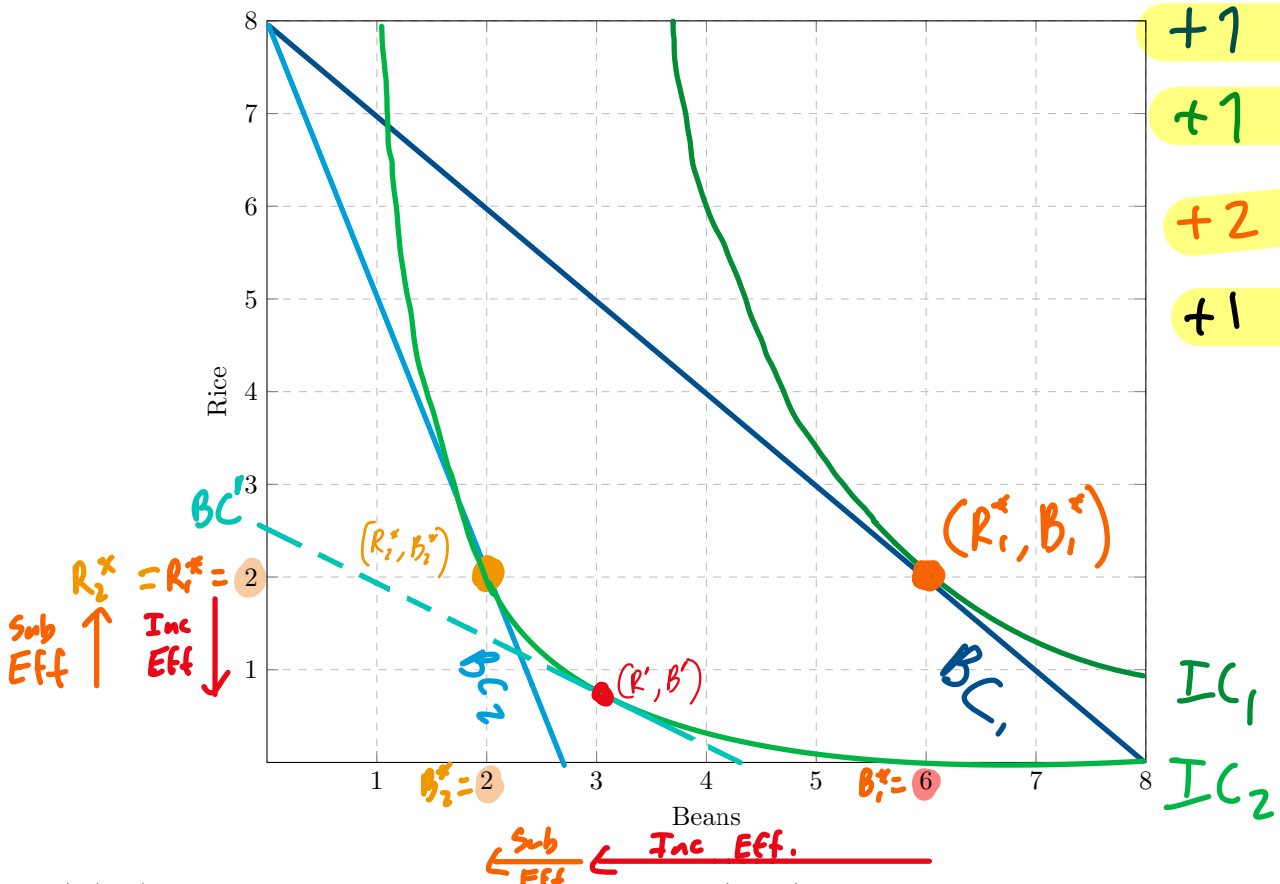
- $\Rightarrow$ $\boxed{R_1^* = 2,\quad B_1^* = 3(2) = 6}$

+1 plug prices into part (a)
+1 use 8 as income
+1 use budget
+1 correct R^*
+1 correct B^*

give full credit if they get correct answer but don't show work

Version 2: Everything will be reflected around Y=X

c) (5 P.) Illustrate your answer to part (b) in the space provided below. Make sure to include the budget constraint, optimal bundle, and an indifference curve and label them appropriately.



+1 BC1
+1 IC1
+2 R*, B*
+1 labels

d) (5 P.) Now suppose that the price of Beans goes from \$1 to \$3. What will Jose's new consumption of Beans become? Add the new budget constraint and indifference curve generated by the price change to your graph above.

from part (a): $\frac{1B}{3R} = \frac{1}{3} \Rightarrow B = R$

$8 = 3B + 1R = 3R + R \Rightarrow \boxed{R_2^* = B_2^* = 2}$

+1 new BC, +1 new IC, +2 correct R_2^*, B_2^*, +1 labels

e) (5 P.) How large is the size of the **income effect** relative to the **substitution effect** in part (d)? Illustrate on your graph. You don't need to calculate the exact quantity changes, but you should justify your answer in words using your graph.

For Beans

Income & Sub Effects are opposite sign, but equal magnitude, so they offset each other

For Rice

Income & Sub Effects both decrease Rice consumption, but Income reduces it more than Sub

Should match whatever is shown on graph

Question 16. (15 P.)
Suppose there are 100 identical consumers, each with an individual demand curve $x_i = \frac{33}{p-5}$ which depends on the market price p.

a) (5 P.) Derive the aggregate market demand curve X.

Does this market demand curve satisfy the Law of Demand? Justify using a derivative.

$X = 2x_i = \frac{66}{p-5}$ | $\frac{88}{p-10}$

V1 | V2

$\frac{\partial X}{\partial p} = -66(p-5)^{-2} < 0$

Law of Demand holds

+1 for adding $x_i + x_i$ or $2x_i$
+2 for correct X
+1 for using any derivative
+1 for answer matching justification

don't need to find actual derivative as long as answer is justified

b) (5 P.) Suppose $p = 10$. Find the price elasticity of the market demand function $\epsilon_{X,p}$.

$\mathcal{E}_{X,p} = \frac{\partial X}{\partial p} \cdot \frac{p}{X}$

+2 correct formula

Version 1

$= \frac{-66}{(p-5)^2} \cdot \frac{p}{66/(p-5)}$

$= \frac{-1}{(p-5)^2} \cdot \frac{p(p-5)}{1}$

$= -\frac{10}{10-5} = \boxed{-2}$

Version 2

$\frac{-88}{(p-10)^2} \cdot \frac{p}{88/(p-10)}$

$= \frac{-88}{(15-10)^2} \cdot \frac{15}{88/(15-10)}$

$= \frac{-88}{88} \cdot \frac{15(5)}{5^2} = \boxed{-3}$

+2 plug in right values

+1 math

c) (5 P.) Based on your answer to part (b), is the market demand **elastic**, **inelastic**, or **unit elastic**?

$|\mathcal{E}_{X,p}| > 1$, so elastic

give partial credit if answer here is consistent w/ answer in part b