

Fall 2023

ECO2011 L07-10

BASIC MICROECONOMICS

November 09, 2023

Barick Chung

Written assignment #03

Instructions:

- 1) Submit by 15:59 p.m. on November 21 (Tuesday), 2023 to the assignment drop box located on the 3rd floor of Zhiren building.
- 2) Late submission is not allowed. If there is reason that a late homework is accepted, at least 21 (out of 100) marks will be deducted.
- 3) Your answers must be in English.
- 4) Your answers must be in hand writing. Photocopy, computer printout or electronic submission will not be accepted.
- 5) Write down your name and student ID on the top of the front page of the answer sheets. Submission without a name or student ID will receive zero mark.
- 6) Once you have submitted your assignment work to the drop box, you cannot take it back or change any part of the answers.
- 7) If you submit more than one copy of the assignment work, the teaching assistants /or graders will randomly choose a copy to grade, and /or give you the lowest score among all your assignment work submissions.
- 8) Write on both sides of papers.
- 9) There is no need to copy the questions.
- 10) Use a pen /or a ball pen.
- 11) Staple your answer sheets if there is more than one sheet. If you do not staple your answer sheets, only the sheet that shows your name and student ID will be graded.
- 12) If you think there is chance of getting stuck, blocked, or locked down in your home town and cannot come back campus to submit your homework, work out your assignment work early and mail it to the teaching assistants' office (3rd floor, Zhiren building) by express delivery and make sure it arrives before the deadline.
- 13) If you have any question related to the submission of this written assignment, ask in Forum#2 on BB.
- 14) Read the University policy regarding academic honesty before doing this assignment.

Question 1

Antonio buys five new college textbooks during his first year at school at a cost of \$80 each. Used books cost only \$50 each. When the bookstore announces that there will be a 10% increase in the price of new books and a 5% increase in the price of used books, Antonio's father offers him \$40 extra.

- a) What happens to Antonio's budget line? Illustrate the change with new books on the vertical axis.
- b) Is Antonio worse or better off after the price change? Explain.

Question 2

Ben allocates his lunch budget between two goods, pizza and burritos.

- a) Illustrate Ben's optimal bundle on a graph with pizza on the horizontal axis.
- b) Suppose now that pizza is taxed, causing the price to increase by 20%. Illustrate Ben's new optimal bundle.
- c) Suppose instead that pizza is rationed at a quantity less than Ben's desired quantity. Illustrate Ben's new optimal bundle.

Question 3

Brenda wants to buy a new car and has a budget of \$25,000. She has just found a magazine that assigns each car an index for styling and an index for gas mileage. Each index runs from 1 to 10, with 10 representing either the most styling or the best gas mileage. While looking at the list of cars, Brenda observes that on average, as the style index increases by one unit, the price of the car increases by \$5000. She also observes that as the gas-mileage index rises by one unit, the price of the car increases by \$2500.

- a) Illustrate the various combinations of style (S) and gas mileage (G) that Brenda could select with her \$25,000 budget. Place gas mileage on the horizontal axis.
- b) Suppose Brenda's preferences are such that she always receives three times as much satisfaction from an extra unit of styling as she does from gas mileage. What type of car will Brenda choose?
- c) Suppose that Brenda's marginal rate of substitution (of gas mileage for styling) is equal to $S/(4G)$. What value of each index would she like to have in her car?
- d) Suppose that Brenda's marginal rate of substitution (of gas mileage for styling) is equal to $(3S)/G$. What value of each index would she like to have in her car?

Question 1

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52.5 → 88
8.8
S&P 100

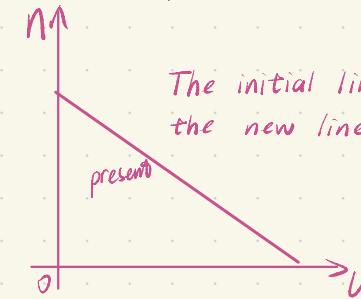
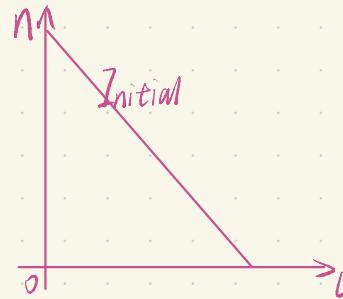
a) What happens to Antonio's budget line? Illustrate the change with new books on the vertical axis.

b) Is Antonio worse or better off after the price change? Explain.

(a) *n* represents new book, *u* represents used book, *B* represents the former total budget

$$\text{Initially, } 80n + 50u = B$$

$$\text{Now, } 88n + 52.5u = B + 40$$



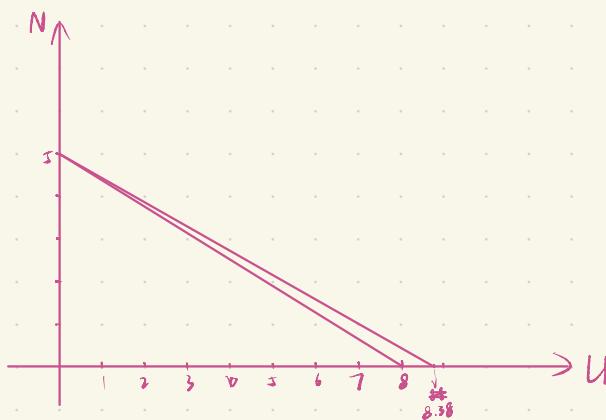
(b) *Antonio buys five new college textbooks during his first year at school at a cost of \$80 each, $80 \times 5 = 400$, $50 \times 5 = 250$*

$$\because B \in [250, +\infty) \quad \text{If } B \in [250, 400]: \frac{\Delta B}{B} = \frac{40}{B} \geq 10\%$$

∴ Antonio can buy more books ∴ He is better off

If $B \in (400, +\infty)$ = He can buy 5 books or even more initially, and $400 + 40 = 440 = 80 \times (1+10\%) \times 5 \quad ∴ He can also buy 5 books or even more now.$

But his budget increases ∴ Antonio is better off.



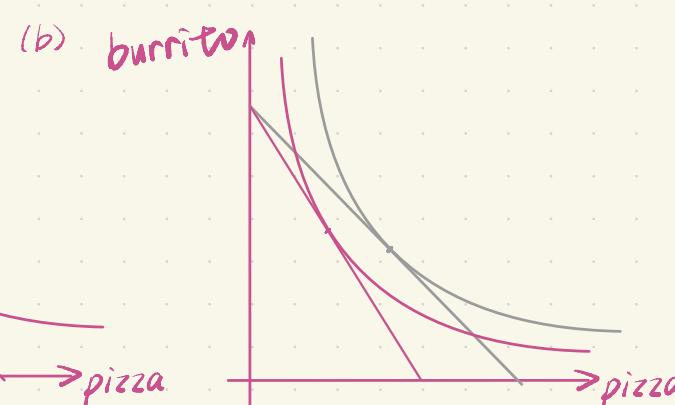
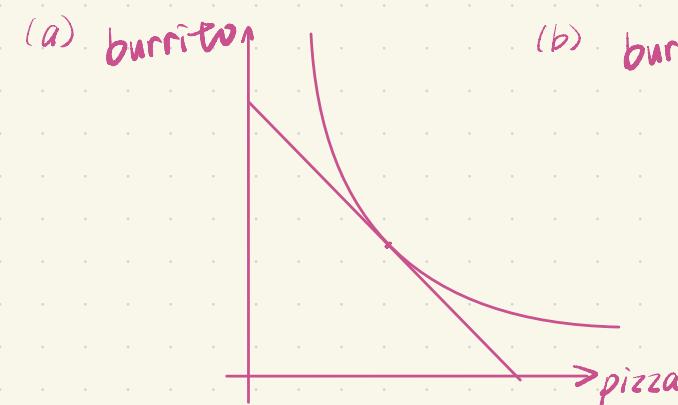
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c) Suppose instead that pizza is rationed at a quantity less than Ben's desired quantity. Illustrate Ben's new optimal bundle.

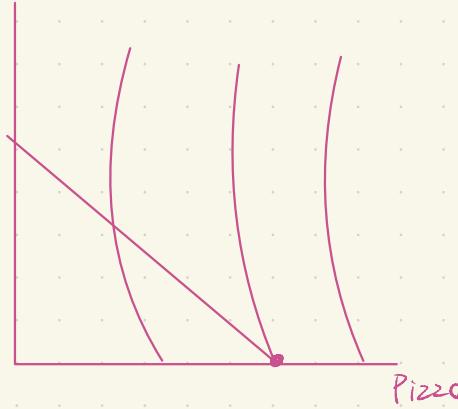


$$P_b \cdot Q_b + P_p \cdot Q_p = B$$

Ben's optimal bundle is where the budget line is tangent to an indifference curve.

$$P_b \cdot Q_b + (P_p \times 120\%) \cdot Q'_p = B$$

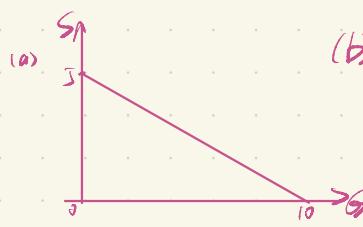
(3) ??



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- Illustrate the various combinations of style (S) and gas mileage (G) that Brenda could select with her \$25,000 budget. Place gas mileage on the horizontal axis.
- Suppose Brenda's preferences are such that she always receives three times as much satisfaction from an extra unit of styling as she does from gas mileage. What type of car will Brenda choose?
- Suppose that Brenda's marginal rate of substitution (of gas mileage for styling) is equal to $S/(4G)$. What value of each index would she like to have in her car?
- Suppose that Brenda's marginal rate of substitution (of gas mileage for styling) is equal to $(3S)/G$. What value of each index would she like to have in her car?



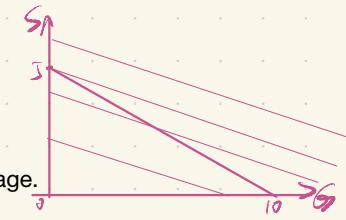
(b) \therefore Brenda's preferences are such that she always receives three times as much satisfaction from an extra unit of styling as she does from gas mileage

$$\therefore MRS_{SG} = 3 \quad \therefore \text{the slope of indifference curve} = -\frac{1}{3}$$

\therefore To get the most satisfaction

\therefore the indifference curve intersects the budget line at (0,5)

\therefore Brenda will choose a car which has 5 in style and 0 in gas mileage.



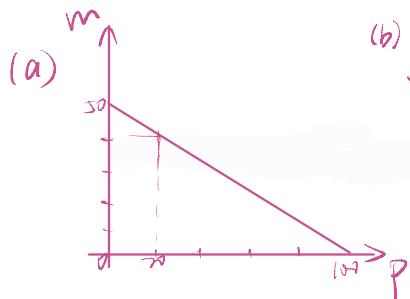
$$(c) \left| -\frac{1}{2} \right| = \frac{S}{4G} \quad \therefore S = 2G \quad \because 1000S + 2500G = 25000 \quad \therefore \begin{cases} S = 4 \\ G = 2 \end{cases}$$

$$(d) \left| -\frac{1}{2} \right| = \frac{3S}{G} \quad \therefore G = 6S \quad \because 1000S + 2500G = 25000 \quad \therefore \begin{cases} S = 1.25 \\ G = 7.5 \end{cases}$$

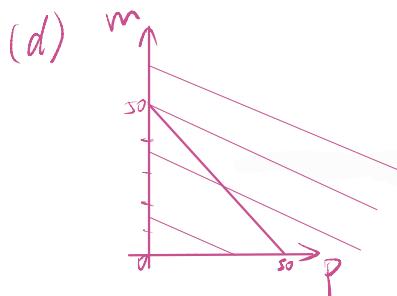
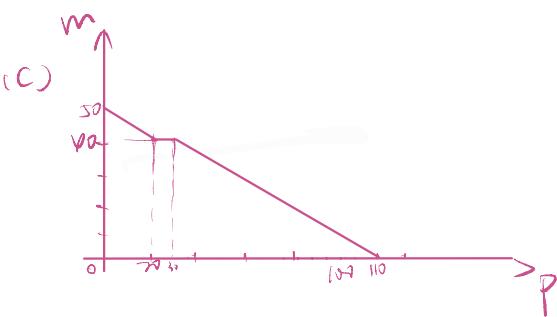
Question 4

Connie has a monthly income of \$200 that she allocates between two goods: meat and potatoes.

- a) Suppose meat costs \$4 per pound and potatoes \$2 per pound. Draw her budget constraint.
- b) Suppose also that her utility function is given by the equation $U(M,P)=2M+P$. What combination of meat and potatoes should she buy to maximize her utility? (Hint: Meat and potatoes are perfect substitutes.)
- c) Connie's supermarket has a special promotion. If she buys 20 pounds of potatoes (at \$2 per pound), she gets the next 10 pounds for free. This offer applies only to the first 20 pounds she buys. All potatoes in excess of the first 20 pounds (excluding bonus potatoes) are still \$2 per pound. Draw her budget constraint.
- d) An outbreak of potato rot raises the price of potatoes to \$4 per pound. The supermarket ends its promotion. What does her budget constraint look like now? What combination of meat and potatoes maximizes her utility?



(b) \because her utility function is given by the equation $U(M,P)=2M+P$ $\therefore MU_M = 2, MU_P = 1 \therefore MRS_{MP} = 2$
 \therefore the slope of indifference curve $= -\frac{1}{2}$ = the slope of budget line
 \therefore she can buy any combination of meat and potatoes on the budget line to maximize her utility.



meat : 50
potato : 0