

Please ensure that you include your full name at the upper portion of this page. Carefully review all the instructions and write your answers in space provided. To receive maximum credit, it is imperative that you show all your work.

**SECTION I: MULTIPLE CHOICE QUESTIONS (40 POINTS)**

1. (5 points) Consider Traian who likes watching TV in general but who is indifferent between watching TV for 54 or 55 minutes. Which assumption on preferences does he violate?
  - a. completeness
  - b. transitivity
  - c. monotonicity
  - d. convexity of indifference curves
  
2. (5 points) Assume that Christo's utility function is  $u(x_1, x_2) = 6x_1 - x_1^2 - 14 + x_2$ . Find the indifference curve at the utility level = 3.
  - a.  $x_2 = \frac{9}{x_1}$
  - b.  $x_1 = x_2^2 + 3x_2$
  - c.  $x_2 = 8 + (x_1 - 3)^2$
  - d.  $x_1 = \sqrt{x_2 + 3} + 2$
  
3. (5 points) Jacqueline's utility function is  $u(x_1, x_2) = x_1 + 6x_2$ . Assume that  $p_1 = 2$  and  $p_2 = 7$ , and her income  $M = 126$ . Find the optimal consumption bundle  $(x_1^*, x_2^*)$ .
  - a. (0, 18)
  - b. (7, 16)
  - c. (14, 14)
  - d. (63, 0)
  
4. (5 points) Evan's utility function is  $u(x_1, x_2) = \min(x_1 - 2x_2, x_2)$ . Assume that  $p_1 = 1$  and  $p_2 = 2$ , and his income  $M = 75$ . Find the optimal consumption bundle  $(x_1^*, x_2^*)$ .
  - a. (0, 32.5)
  - b. (25, 25)
  - c. (45, 15)
  - d. (75, 0)

5. (5 points) Consider the following three bundles:

	Food	Clothing
A	8	5
B	5	8
C	6	3

If preferences satisfy all four of the usual assumptions:

- $A \succ B$
  - $B \succ C$
  - both a. and b. are correct
  - none of the above
6. (5 points) An increase in income, holding prices constant, can be represented as
- a change in the slope of the budget constraint
  - a parallel outward shift in the budget constraint
  - an outward shift of the budget constraint with its slope becoming flatter
  - a parallel inward shift in the budget constraint
  - there will be no effect on the budget constraint
7. (5 points) Along a given indifference curve,
- both the combination of goods and the consumer's income remain constant.
  - the combination of goods remains constant.
  - the combination of goods remains constant but the level of utility varies.
  - the combination of goods varies but the level of utility remains constant.
8. (5 points) If Sidharth's  $MRS_{P,B}$  of beer ( $B$ ) for pizza ( $P$ ) is equal to 4, then Sidharth would willingly give up
- 4, but no more than 4, beers for an additional pizza
  - 4, but no more than 4, pizzas for an additional beer
  - $\frac{1}{4}$ , but no more than  $\frac{1}{4}$ , pizza for an additional beer
  - $\frac{1}{4}$ , but no more than  $\frac{1}{4}$ , beer for an additional pizza
  - both a. and c. are correct



- c. (5 points) Jayden's utility function over both types of coffee blends is  $u(x_1, x_2) = x_1^5 x_2^5$ . Find his MRS for any bundle  $(x_1, x_2)$ . *Show all steps and simplify into the most condensed form.*
- d. (5 points) Using your answer in part c., what is the value of MRS at bundle  $(2, 4)$ ? Which of the two coffee blends is more valuable to Jayden? *Explain your answer.*
- e. (5 points) Using the tangency condition, derive demand functions for  $x_1$  and  $x_2$  as a function of  $p_1, p_2, M$ . *Show all steps.*
- f. (5 points) What fraction of total income is spent on Columbian Supremo?
- g. (5 points) Using part e., find the optimal consumption levels of two types of coffee blend  $(x_{1A}^*, x_{2A}^*)$  for:  $p_1 = \$50, p_2 = \$25$ , and  $M = \$500$  (give two numbers). *Show all steps.*

- h. (5 points) Using part e., find the new optimal consumption levels of two types of coffee blend  $(x_{1C}^*, x_{2C}^*)$  after the price of Ethiopian Yirgacheffe decreased:  $p'_1 = \$25, p_2 = \$25$ , and  $M = \$500$  (give two numbers). *Show all steps.*
- i. (5 points) Using parts g. and h., what is the total change (total effect) in consumption of Ethiopian Yirgacheffe? (give a number). *Show all steps.*
- j. (5 points) Using part e., is Ethiopian Yirgacheffe an inferior or a normal good? (Using the income elasticity concept plus one sentence explaining why.)
- k. (5 points) Decompose the total change (total effect) in consumption of  $x_1$  you found in part i. into a substitution and income effect. (Calculate the two numbers.)
- l. (5 points) Multiplying Jayden's utility function by 10 and adding a constant of 2, while assuming that  $p_1 = \$50, p_2 = \$25$ , and  $M = \$500$ . How has his optimal consumption levels of two types of coffee blend changed compared to part g., and why? *Show all steps.*