

# EconS 301- Intermediate Microeconomic Theory

## Recitation - Friday September 23rd, 2022.

1. Consider that Eric's utility function is  $u(x, y) = 2x + 3y$ , which is just an example of  $u(x, y) = ax + by$ , where  $a = 2$  and  $b = 3$ . Show that this utility function satisfies completeness, transitivity, monotonicity, strict monotonicity, and nonsatiation. Then consider one of Eric's friends, John, who has a utility function  $u(x, y) = \min\{2x, 3y\}$ . Show that the utility function satisfies all the properties, except for strict monotonicity.
2. Ana's utility function is  $u(x, y) = 5(x - 2)^{1/2}(y - 1)^{1/3}$ . Find her marginal utilities and her MRS, and check if it is decreasing in  $x$ .
3. Consider an individual with the Cobb-Douglas utility function

$$u(x, y) = \sqrt{x}\sqrt{y}.$$

Assume that her income is  $I = \$120$ , the price of good  $x$  is  $p_x = \$4$ , and the price of good  $y$  is  $p_y = \$10$ .

- (a) Find the marginal utility of good  $x$ ,  $MU_x$ , and that of good  $y$ ,  $MU_y$ .
  - (b) Given the results in part (a), does this utility function satisfy monotonicity? What about strict monotonicity?
  - (c) Using the marginal utilities you found in part (a), find the  $MRS$ .
4. Consider again Eric's demand function,  $x = \frac{5I}{\sqrt{p_x - 3p_y}}$ . Find its price elasticity  $\varepsilon_{x, p_x}$ , and interpret your result.
  5. Chelsea's utility function is  $u(x, y) = 3x + 4y^{1/2}$ , her income is  $I = \$220$ , and  $p_y = \$1$ . The price of good  $x$  decreases from  $p_x = \$3$  to  $p'_x = \$2$ . Find the substitution and income effects.