

Questions from prior midterms

1. Short problems

- Suppose there are two goods consumed by Simone, cigarettes and coffee, with prices p_{ci} and p_{co} . Simone's income is m . Draw her budget constraint, carefully labeling the slope and intercepts. Show how a quantity tax t on cigarettes affects her budget constraint, and draw this on the graph. Show what has happened to her budget set.
- True/False/Uncertain. Jack's inverse demand for a good is given by $P = 10 - (1/2)q^{\text{jack}}$ while Jill's demand for the same good is $P = 15 - q^{\text{jill}}$. Jack has elastic demand while Jill has inelastic demand.
- Justin's demand for toothpaste and candy bars is as follows: $x_t = pc/pt$ and $x_c = (m-pc)/pt$. Suppose the price of both candy bars and toothpaste is 1. Draw the income consumption curve and the Engel curves for both toothpaste and candy.
- Utility over x and y is given by $U=4\ln(x) + 2\ln(y)$. Suppose consumption of x and y is given by $(x=5,y=10)$. If one unit of x is taken away, approximately how many extra y would need to be given to keep utility constant?
- Suppose Sean and Justin both live in Santa Cruz and both consume tacos and burritos at Taco Bell. They each face the same prices for tacos and burritos, but Sean likes tacos a lot more than Justin, who prefers burritos.
True/False/Uncertain. At their optimal consumption levels, the marginal rate of substitution between tacos and burritos will be greater for Sean than Justin.

2. Multi-part problem Whitney is from Texas and therefore consumes only two goods, gasoline and shotgun shells, represented by x_g and x_s . Her preferences for x_g and x_s are given by $U = \ln(x_g) + \ln(x_s)$. Prices for x_g and x_s are given initially by $p_g=2$ and $p_s=2$. Her income to allocate across these two goods is given by \$30.

- Using the marginal rate of substitution and the prices of gasoline and shotgun shells, explain why the bundle $x_g = 5$ and $x_s = 10$, though satisfying her budget constraint, do not maximize Whitney's utility.
- What is the level of consumption of x_g and x_s that maximizes Whitney's utility?
- If the price of shotgun shells increased to 4, what is her new level of consumption of x_g and x_s ?

2. Multi-part problem Suppose that two goods are purchased by a consumer, cd players and speakers. These goods are perfect complements, and two speakers are consumed for every cd player. Prices are given by P_c and P_s , and income is given by m .

- What is the inequality describing the budget constraint faced by the consumer? Graph the budget constraint, labeling the axes and the slope of the budget line.

- b. Solve the consumer's optimization problem, finding the demand functions $X_c(P_c, P_s, m)$ and $X_s(P_c, P_s, m)$. Graphically represent the indifference curve and budget line corresponding to the optimal bundle.
- c. In this example, are cd players a normal good? Are they ordinary or Giffen?
- d. Suppose income is given by $m=300$. The price of a cd player is initially 50 while the price of a speaker is 25. What is the optimal bundle based on what you found in part b? Suppose the price of CD players went up to 100. What would be the new optimal bundle? Show graphically the old and new budget lines, and the indifference curves corresponding to the optimal bundle under the original and new prices.