

Homework #2

1. Neville's passion is fine wine. When the prices of all other goods are fixed at current levels, Neville's demand function for high-quality claret is $q = 0.02m - 2p$, where m is his income, p is the price of claret (in pounds), and q is the number of bottles of claret that he demands. Neville's income is 7,500 pounds, and the price of a bottle of suitable claret is 30 pounds.
 - (a) How many bottles of claret will Neville buy?
 - (b) If the price of claret rose to 40 pounds, how much income would Neville have to have in order to be exactly able to afford the amount of claret and the amount of other goods that he bought before the price change?
 - (c) At this income, and a price of 40 pounds, how many bottles would Neville buy?
 - (d) At his original income of 7,500 and a price of 40, how much claret would Neville demand?
 - (e) When the price of claret rose from 30 to 40, calculate changes of his demand due to the *substitution effect* and *income effect*.
2. Mr. Cog works in a machine factory. He can work as many hours per day as he wishes at a wage rate of w . Let C be the number of dollars he has to spend on consumer goods and let R be the number of hours of leisure that he chooses.
 - (a) Suppose that Mr. Cog earns \$8 an hour and has 18 hours per day to devote to labor or leisure, and suppose that he has \$16 of nonlabor income per day. Write an equation for his budget between consumption and leisure.
 - (b) draw his budget line in the graph below. His initial endowment is the point where he doesn't work, but keeps all of his leisure. Mark this point on the graph below with the letter A

- (c) If Mr. Cog has the utility function $U(R; C) = CR$, how many hours of leisure per day will he choose? How many hours per day will he work?
- (d) Suppose that Mr. Cog's wage rate rose to \$12 an hour. Use red ink to draw his new budget line. (He still has \$16 a day in nonlabor income.) If Mr. Cog continued to work exactly as many hours as he did before the wage increase, how much more money would he have each day to spend on consumption? But with his new budget line, how many hours he will chooses to work? By what amount his consumption actually increase?
- (e) Suppose that Mr. Cog still receives \$8 an hour but that his nonlabor income rises to \$48 per day. Use black ink to draw his budget line. How many hours does he choose to work?
- (f) Suppose that Mr. Cog has a wage of \$ w per hour and a nonlabor income of \$ m . As before, assume that he has 18 hours to divide between labor and leisure. Cog's budget line has the equation $C + wR = m + 18w$. Using the same methods you used in the chapter on demand functions, find the amount of leisure that Mr. Cog will demand and his supply of labor as a function of wages and of nonlabor income.
3. Nickleby has an income of \$2,000 this year, and he expects an income of \$1,100 next year. He can borrow and lend money at an interest rate of 10%. Consumption goods cost \$1 per unit this year and there is no inflation.
- (a) What is the present value of Nickleby's endowment? What is the future value of his endowment? With blue ink, show the combinations of consumption this year and consumption next year that he can afford. Label Nickelby's endowment with the letter E .
- (b) Suppose that Nickleby has the utility function $U(C_1, C_2) = C_1C_2$. Write an expression for Nickleby's marginal rate of substitution between consumption this year and consumption next year. (Your answer will be a function of the variables C_1, C_2 .)
- (c) What is the slope of Nickleby's budget line? Write an equation that states that the slope of Nickleby's indifference curve is equal to the slope of his budget line when the interest rate is 10%. Also write down Nickleby's budget equation.
- (d) Solve (C_1, C_2) from these two equations. Label this point A .
- (e) Will he borrow or save in the first period? How much?

- (f) On your graph use red ink to show what Nickleby's budget line would be if the interest rate rose to 20%. Knowing that Nickleby chose the point A at a 10% interest rate, even without knowing his utility function, you can determine that his new choice cannot be on certain parts of his new budget line. Draw a squiggly mark over the part of his new budget line where that choice can not be. (think of WARP.)
- (g) Solve for Nickleby's optimal choice when the interest rate is 20%.
- (h) Will he borrow or save in the first period? How much?
4. Bernice's preferences can be represented by $u(x, y) = \min\{x, y\}$, where x is pairs of earrings and y is dollars to spend on other things. She faces prices $(p_x, p_y) = (2, 1)$ and her income is 12.
- (a) Draw in pencil on the paper some of Bernice's indifference curves and her budget constraint. Calculate her optimal bundle of choice (x^*, y^*) .
- (b) The price of a pair of earrings rises to \$3 and Bernice's income stays the same. Using blue ink, draw her new budget constraint. Calculate her new optimal bundle.
- (c) What bundle would Bernice choose if she faced the original prices and had just enough income to reach the new indifference curve? Draw with red ink the budget line that passes through this bundle at the original prices. How much income would Bernice need at the original prices to have this (red) budget line?
- (d) Calculate the maximum amount that Bernice would pay to avoid the price increase.
- (e) What bundle would Bernice choose if she faced the new prices and had just enough income to reach her original indifference curve? Draw with black ink the budget line that passes through this bundle at the new prices. How much income would Bernice have with this budget?
- (f) In order to be as well-off as she was with her original bundle, How much would Bernice's original income rise by?
5. F. Flintstone has quasilinear preferences and his inverse demand function for Brontosaurus Burgers is $P(q) = 30 - 2q$. Mr. Flintstone is currently consuming 10 burgers at a price of 10 dollars.
- (a) How much money would he be willing to pay to have this amount rather than no burgers at all? What is his level of (net) consumer's surplus?

- (b) The town of Bedrock, the only supplier of Brontosaurus Burgers, decides to raise the price from \$10 a burger to \$14 a burger. What is Mr. Flintstone's change in consumer's surplus?
6. Karl Kapitalist is willing to produce $p/2 - 20$ chairs at every price, $p > 40$. At prices below 40, he will produce nothing. If the price of chairs is \$100, how much is his producer's surplus?