

- 1) (18 pts) The growing obesity epidemic in the United States has caused many people to advocate the use of a fat tax to control consumption of fatty foods. Consider the market for potato chips. Assume the before-tax equilibrium price is \$1 per bag and the before-tax equilibrium quantity is 500 million bags per year.
 - a) Draw a diagram showing the effect of imposing an ad-valorem sales tax on potato chips. Label the pre and post tax prices and quantities. (6)
 - b) Suppose the elasticity of demand is -0.5 and the elasticity of supply is 1.0. How much of the tax is borne by the consumers of potato chips and how much by the producers? (6)
 - c) What percentage sales tax would the government have to impose to reduce the quantity demanded by 20%? (6)

- 2) (18 pts) Alice likes to go out to dinner, but only eats barbecue or Mexican food. At her current consumption level, everything else constant, she's willing to trade 2 barbecue dinners for 1 Mexican dinner. For each of the following statements, identify whether the statement is true, false, or ambiguous and explain why.
 - a) Alice gets more utility from eating 3 Mexican dinners than she does from eating 5 barbecue dinners. (6)
 - b) If the price of a barbecue dinner is \$15 and the price of a Mexican dinner is \$25, Alice's consumption is not optimal. (6)

- 3) (16 pts) Allen runs a bakery using hours of his time (l) and ovens (k). When Allen isn't working at his bakery, he tutors students in biology for a fee of \$20 an hour. Allen has a 5-year lease on a building with 5 ovens and can't break his lease. The monthly rent is \$200. For every hour he works, Allen can make 4 loaves of bread per oven.
 - a) Ignoring the cost of flour and yeast, draw a picture showing Allen's (short run) marginal, average variable and average cost curves. Explain what you've drawn. (8)
 - b) There are no other commercial ovens in town and the local pastry chef now offers to rent Allen's ovens at \$50 per oven. The marginal product of labor is $2k$ and the marginal product of capital is l . What is Allen's optimal capital to labor ratio? (8)

- 4) (15 pts) The Smiths have two sons, Nate and Tim, who both go to college. Their parents give both boys an allowance for food and textbooks. (For simplicity, assume Nate and Tim have identical preferences between food and textbooks and that both are normal goods). Nate attends the University of Nebraska and Tim attends Berkeley (where food prices are higher). Both boys buy their textbooks from an online store with free shipping and no tax.
 - a) Using indifference curves and budget constraints, show the choices of Nate and Tim if the Smiths give both boys the same monthly

- allowance. (5)
- b) The Smiths realize that Berkeley is more expensive than Nebraska and want both boys to be equally well off. Show in your diagram how the Smiths should compensate Tim. (5)
 - c) Explain how your answer relates to the income and substitution effects of a price change from Nebraska food prices to Berkeley food prices. (5)
 - d) (15 pts) Caleb spends his monthly allowance on movie tickets (m) and video games (g). Movie tickets cost \$10. His marginal utility of movie tickets is g and his marginal utility of video games is $4m$.
 - e) If Caleb's monthly allowance is \$100 and the price of video games is \$40, how much of each good will Caleb choose to consume? (7)
 - f) Use this approach to derive Caleb's demand curve for video games as a function of the price of video games (p_g) and his monthly allowance (I), assuming the price of movie tickets is \$10. (8)
- 5) (18 pts) Jim coaches a football team. Provide an economic explanation of how he should divide practice between drills (designed to improve individual skills and endurance) and practicing team plays. For simplicity, assume the players never work on their skills outside of practice. (18)