

## Ec306 Midterm

This is a take-home exam, due on or before class on Thurs. Nov. 18. Please show your reasoning along with your answers. You may *not* consult with anyone else regarding this exam.

1. Linda spends her entire budget and consumes 15 units of  $x$  and 19 units of  $y$ . The price of  $x$  is twice the price of  $y$ . Her income doubles and the price of  $y$  doubles, but the price of  $x$  stays the same. If she continues to buy 19 units of  $y$ , what is the largest number of units of  $x$  that she can afford?
  - a 30
  - b 15
  - c 32
  - d 34
  - e There is not enough information to say.
2. Nick's utility function is  $U(x, y) = 33xy$ . He has 12 units of good  $x$  and 6 units of  $y$ . Boris's utility function for the same two goods is  $U(x, y) = 2x + 5y$ . Boris has 9 units of  $x$  and 13 units of  $y$ .
  - a Nick prefers Boris's bundle to his own bundle, but Boris prefers his own bundle to Nick's.
  - b Boris prefers Nick's bundle to his own, but Nick prefers his own bundle to Boris's.
  - c Each prefers the other guy's bundle to his own.
  - d Neither prefers the other guy's bundle to his own.
  - e Since they have different preferences, there is not enough information to determine who envies whom.
3. Fanny consumes only grapefruits and grapes. Her utility function is  $U(x, y) = x^3y^6$ , where  $x$  is the number of grapefruits consumed and  $y$  is the number of grapes consumed. Fanny's income is 48, and the prices of grapefruits and grapes are 1 and 3, respectively. How many grapefruits will she consume?
  - a 8
  - b 5.33
  - c 48
  - d 16
  - e None of the above.

4. Will Wisp will live for exactly two periods. His utility function is  $U(c_1, c_2) = c_1 c_2$  where  $c_1$  is consumption in period 1 and  $c_2$  is consumption in period 2. He will have no income in period 2. His income in period 1 is 30,000. If the interest rate falls rises from 12% to 11%:
- a his savings will increase and his consumption in period 2 will increase.
  - b his savings will not change, but his consumption in period 2 will decrease.
  - c his consumption in both periods will increase.
  - d his consumption in both periods will decrease.
  - e his consumption in period 1 will decrease and his consumption in period 2 will increase.
5. The interest rate is 10% and will remain so forever. You do not drink wine but are interested in buying some for investment purposes. Assume that there are no transactions costs or storage costs and a certain bottle of wine will be worth \$44 one year from now, \$50 two years from now, and \$61, three years from now. After that it turns to worthless vinegar. How much should you be willing to pay for a bottle? (Pick the closest answer.)
- a 40
  - b 41.32
  - c 41.32
  - d 45.83
  - e 49.47
6. Yoram's utility function is  $U(x, y) = 2x + 5y$ . The price of  $x$  is \$4 and the price of  $y$  is \$15. Yoram has \$150 a week to spend on  $x$  and  $y$ . Yoram is offered a chance to join a club of  $y$ -consumers. If he joins, he can get  $y$  at a price of \$10. What is the most that Yoram would be willing to pay to join the club?
- a nothing
  - b \$30 a week
  - c \$50 a week
  - d \$75 a week
  - e None of the above.
7. If the demand function for tickets to a play is  $q = 3,600 - 45p$ , at what price will total revenue be maximized?
- a 160
  - b 80
  - c 40
  - d 20
  - e None of the above.

8. The inverse demand function for cases of whiskey is defined by  $p = 160 - 6q$  and the inverse supply function is defined by  $p = 61 + 3q$ . Originally there was no tax on whiskey. Then the government began to tax suppliers of whiskey \$27 for every case they sold. How much did the price paid by consumers rise when the new equilibrium was reached.
- a It rose by 27 dollars.
  - b It rose by 29 dollars.
  - c It rose by 18 dollars.
  - d It rose by 16 dollars.
  - e None of the above.
9. A competitive firm produces output using three fixed factors and one variable factor. The firm's short run production function is  $q = 455x - 5x^2$  where  $x$  is the amount of variable factor used. The price of output is \$3 per unit and the price of the variable factor is \$15 per unit. In the short run, how many units of  $x$  should the firm use?
- a 22
  - b 90
  - c 31
  - d 45
  - e None of the above.
10. A goatherd has the cost function  $c(y) = 3y^2$  where  $y$  is the number of tubs of goat cheese she makes per month. She faces a competitive market for goat cheese, with a price of \$42 a tub. How many tubs should she produce per month?
- a the square root of 42
  - b 9
  - c 7
  - d the square root of 14
  - e 3.50