Extra exercises

EE311

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2. Draw the indifference curves for the following individuals' preferences for two goods: hamburgers and beer.
   a. Al likes beer but hates hamburgers. He always prefers more beer no matter how many hamburgers he has.
   b. Betty is indifferent between bundles of either three beers or two hamburgers. Her preferences do not change as she consumes any more of either food.
   c. Chris eats one hamburger and washes it down with one beer. He will not consume an additional unit of one item without an additional unit of the other.
   d. Doreen loves beer but is allergic to beef. Every time she eats a hamburger she breaks out in hives.

4. Suppose Bill views butter and margarine as perfectly substitutable for each other.
   a. Draw a set of indifference curves that describes Bill's preferences for butter and margarine.
   b. Are these indifference curves convex? Why?
   c. If butter costs \$2 per package, while margarine costs only \$1, and Bill has a \$20 budget to spend for the month, which butter-margarine market basket will he choose? Can you show this graphically?

8. Suppose that Samantha and Jason both spend \$24 per week on video and movie entertainment. When the prices of videos and movies are both \$4, they each rent 3 videos and buy 3 movie tickets. Following a video price war and an increased cost of movie tickets, the video price falls to \$2 and the movie ticket increases to \$6. Samantha now rents 6 videos and buys 2 movie tickets; Jason, however, buys 1 movie ticket and rents 9 videos.
   a. Is Samantha better off or worse off after the price change?
   b. Is Jason better off or worse off?

11. The utility that Meredith receives by consuming food F and clothing C is given by $u(F,C) = FC$. Suppose that her income in 1990 is \$1,200 and the prices of food and clothing are \$1 per unit of each. However, by 1995 the price of food has increased to \$2 and the price of clothing to \$3. Let 100 represent the cost-of-living index for 1990. Calculate the ideal and the Laspeyres cost-of-living index for Meredith for 1995. (*Hint:* Meredith will spend equal amounts on food and clothing.)

9. Connie Consumer has a monthly income of $200, which she allocates between two goods: meat and potatoes.
   a. Suppose meat costs $4 per pound and potatoes cost $2 per pound. Draw her budget constraint.
   b. Suppose also that her utility function is given by the equation $u(M,P) = 2M + P$. What combination of meat and potatoes should she buy to maximize her utility? (*Hint:* Meat and potatoes are perfect substitutes.)
   c. Connie's supermarket has a special promotion. If she buys 20 pounds of potatoes (at $2 per pound), she gets the next 10 pounds for free. This offer applies only to the first 20 pounds she buys. All potatoes in excess of the first 20 pounds (excluding bonus potatoes) are still $2 per pound. Draw her budget constraint.
   d. An outbreak of potato rot raises the price of potatoes to $4 per pound. The supermarket ends its promotion. What does her budget constraint look like now? What combination of meat and potatoes maximizes her utility?

1. Suppose a chair manufacturer is producing in the short run when equipment is fixed. The manufacturer knows that as the number of laborers used in the production process increases from 1 to 7, the number of chairs produced changes as follows: 10, 17, 22, 25, 26, 25, 23.
   a. Calculate the marginal and average product of labor for this production function.
   b. Does this production function exhibit diminishing returns to labor? Explain.
   c. Explain intuitively what might cause the marginal product of labor to become negative.

6. The marginal product of labor in the production of computer chips is 50 chips per hour. The marginal rate of technical substitution of hours of labor for hours of machine-capital is 1/4. What is the marginal product of capital?

1. Assume a computer firm's marginal costs of production are constant at $1000 per computer. However, the fixed costs of production are equal to $10,000.
   a. Calculate the firm's average variable cost and average total cost curves.
   b. If the firm wanted to minimize the average total cost of production, would it choose to be very large or very small? Explain.

7. You are in charge of cost control in a large metropolitan transit district. A consultant you have hired comes to you with the following report:

   Our research has shown that the cost of running a bus for each trip down its line is $30 regardless of the number of passengers it carries. Each bus can carry 50 people. At rush hour, when the buses are full, the average cost per passenger is 60 cents. However, during off-peak hours, average ridership falls to 18 people, and average cost soars to $1.67 per passenger. As a result, we should encourage more rush-hour business when costs are cheaper and discourage off-peak business when costs are higher.

   Do you follow the consultant's advice? Discuss.

11. The total short-run cost function of a company is given by the equation $C = 190 + 53Q$, where C is the total cost and Q is the total quantity of output, both measured in tens of thousands.
   a. What is the company's fixed cost?
   b. If the company produces 100,000 units, what is its average variable cost?
   c. What is its marginal cost *per unit* produced?
   d. What is its average fixed cost?
   e. Suppose the company borrows money and expands its factory. Its fixed cost rises by $50,000, but its variable cost falls to $45,000 per 10,000 units. The cost of interest (I) also enters into the equation. Each one-point increase in the interest rate raises costs by $30,000. Write the new cost equation.

*13. A computer company produces hardware and software using the same plant and labor. The total cost of producing computer processing units H and software programs S is given by

$$TC = aH + bS - cHS$$

where a, b, and c are positive. Is this total cost function consistent with the presence of economies or diseconomies of scale? With economies or diseconomies of scope?