

13 Point Questions: Answer only 3 of the 4 questions in this section:

1. If the marginal product of labor is decreasing as more labor is used, must the average product of labor also be decreasing? (6 points) Can a firm be producing efficiently when the marginal product of labor is negative? (7)
2. Suppose the demand for corn oil is $Q = 1,000 - 10p + 10Y$, where Y = income, p = price, and Q = quantity. Write a formula for the price elasticity of demand for corn oil. #
3. An hour-long exam consists of two problems, each worth a maximum of 50 points. A student doesn't have enough time to get full-credit on both questions. How should this student allocate his or her time spent on each problem to maximize the total score? Illustrate your answer using a figure. #
4. The United States imposes a binding quota of Q^* on steel imports. Suppose the U.S. supply curve is relatively inelastic while the supply curve of foreign supplier is very elastic. Use a figure to show the effect of the quota on the U.S. price of steel, the quantity of steel sold by U.S. firms, and the total quantity sold in the United States. #

20 Point Questions: Answer only 2 of the 3 questions in this section:

5. The government is considering either setting (i) a binding electricity price ceiling (#) or (ii) providing a per unit subsidy to consumers so that they would pay the same price as they would with a price ceiling. (A) Contrast the effects of these two policies (discuss prices for firms and consumers, quantities,...). (13) (B) What determines the incidence of the subsidy on consumers? (7)
6. A manufacturing firm uses only capital (K) and labor (L) to produce its product, using a production function of $Q = 10KL$. It pays its workers $w = \$15$ per hour and has a rental cost of capital of $r = \$5$ per hour. (A) Does this firm's production function exhibit decreasing, constant, or increasing returns to scale? (6) # (B) The firm wants to produce 480 units of output. Find the optimal bundle of inputs (L^*, K^*) it should use to minimize its cost of production. (Note: $MP_L = 10K$ and $MP_K = 10L$.) (14)
7. At the original wage w_1 , Janice chose to work 4 hours a day. (A) Her boss now tells her that all employees must work at least 8 hours a day. Use a figure to show Janice's new budget constraint. Show how Janice responds to this new budget constraint: How many hours does she work? (If there are several possibilities, explain why.) (9) # (B) Now her boss says that she must work at least 8 hours, but offers her a higher wage ($w_2 > w_1$), which is high enough that she is as well off as before the boss imposed the full-time restriction. Use a figure to show how many hours she is willing to work. (11)

21 Point Questions: Answer the following question:

8. The government decides to subsidize day care to help working parents. They consider two subsidy programs: #
 - Program 1: A family receives a subsidy of s dollars per day for each day a child attends an authorized day care facility.
 - Program 2: A family receives a lump-sum subsidy for each child attending an authorized day care facility. The government intends to set the subsidies so that the same amount will be paid per year by the government under either plan for typical parents (who have usual-shaped indifference curves).
 (A) Show how the two subsidies affect the budget constraints parents face. (9)
 (B) Which program is favored by parents and which by day care providers? Why? (12)
 [Hint: Given a subsidy of s , a typical family chooses a bundle of a certain number of days of day care and an amount of all other goods. The budget line with the lump-sum subsidy goes through that same bundle.]