

Second Exam

Write all answers in your blue book and show all work there. Return your exam in your blue book.

20 pts.

1) Engineers in your firm have provided the following production function for power transmission.

$$Q = 5S^2C^2 - .01S^3C^3$$

where Q = quantity of current output

S = size of cable

C = current input

a) Use calculus to diagram the production function (Q as a function of C) for a cable size of 2 (S=2). (Plot only two points and use calculus to get the rest of the shape.)

b) At what level of C do diminishing marginal returns set in? (S=2)

30 pts.

2) Your company's accountants have provided the following costs for producing X in March. The last four categories have been allocated via a rule of thumb.

Units of X	1000
Materials	\$40000
Direct Labor	\$100000
Office Expense	\$3000
Lighting	\$500
Heat	\$4000
Other fixed	\$2000

a) Based on these data what would you say is the variable cost per unit? Show your work and make your assumptions explicit.

b) If you had April's data, what would you do to figure incremental cost for X?

c) Suppose that average variable cost is \$140, incremental cost per unit is \$200 and the product's price is \$160. Should your company be producing at the 1000 unit level? Consider both the short run and the long run.

20 pts.

3)

Suppose that you were presented with the scatter diagram of data above.

a) What form (specification) of a cost function might you expect to best fit the data?

b) Does the pattern in the diagram suggest that you are viewing short run or long run data? Explain.

30 pts.

4) Your firm has been leading the industry price for some time with others usually following. Current price is \$13. Next quarter you expect your firm's demand and cost to be

$$P = 20 - .001Q \quad \text{and}$$

$$TC = 20000 + 5Q + .0005Q^2$$

a) Find the short run profit maximizing price, assuming that others follow.

b) If others don't follow how would you adjust? (A generality is all that can be given here.)

c) Even if others do follow, what other concern might you have that would lead you to charge less than the price found in part a.

I have neither given nor received unfair aid on this test.

