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Econ 101
Offline HW 3

1.)

QUESTION :
A commercial fisherman notices the following relationship between hours spent fishing and the quantity of fish caught:

Hours	Quantity of Fish (in pounds)
0	0
1	10
2	18
3	24
4	28
5	30

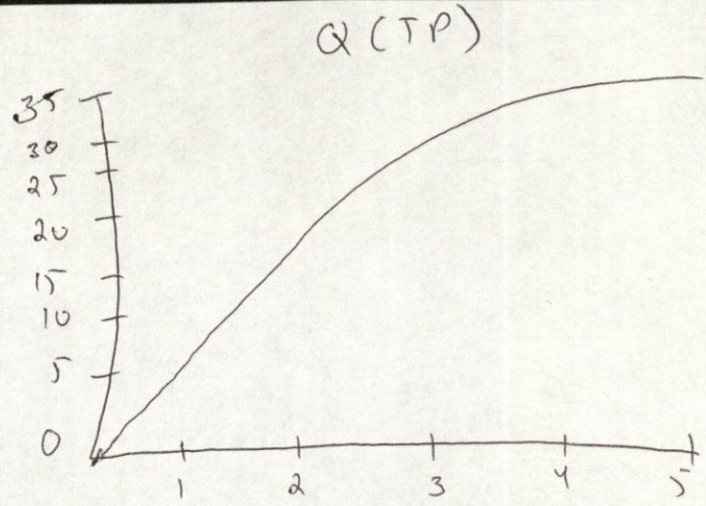
a. What is the marginal product of each hour spent fishing?
b. Use these data to graph the fisherman's production function. Explain its shape.
c. The fisherman has a fixed cost of $10 (his pole). The opportunity cost of his time is $5 per hour. Graph the fisherman's total-cost curve. Explain its shape.

SOLUTION :

a. Total product, TP = Q
Marginal product, MP = Change in TP / Change in Hours

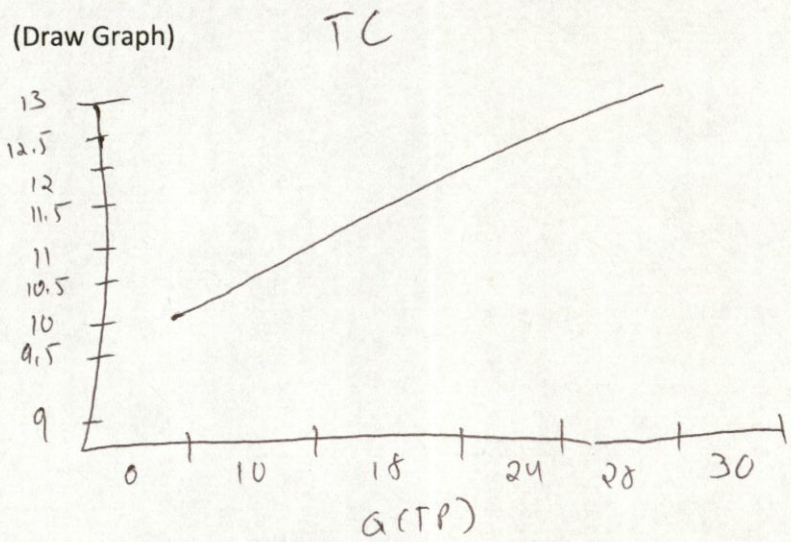
Hours	(TP)	MP
0	0	
1	10	10
2	18	8
3	24	6
4	28	4
5	30	2

b. (Draw Graph)



The production function is a diminishing production function: As Hours (input) increase, output (TP) increases at a lower rate. So the marginal product is reducing (diminishing) as more inputs are added.

c. (Draw Graph)



FC = $10. Opportunity cost = $5 per hour.

Total cost = FC + Hourly opportunity cost x number of hours

TC = 10 + 5H

The TC curve is a straight line, whose intercept = $10 (FC). After this level, TC increases linearly with increase in H (and increase in Q).

2.) QUESTION :

a. Complete this puzzle, filling in the missing numbers using the information provided.

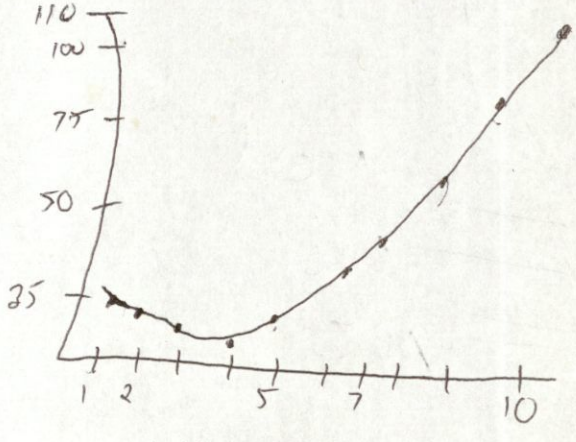
b. Draw four different cost curves in the same X-Y plane as you complete the table. i.e.,

2a

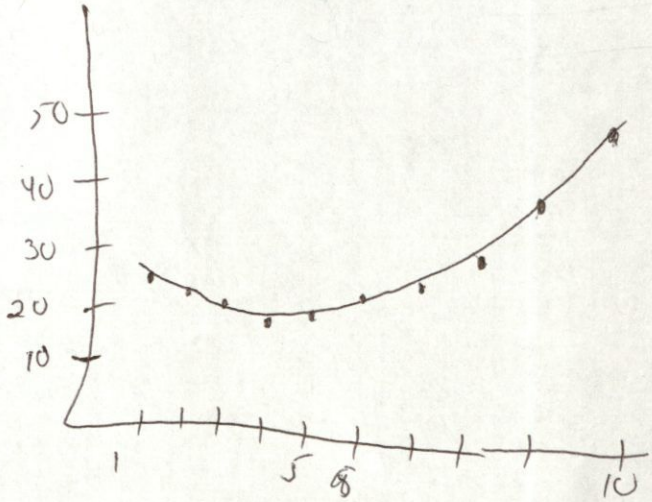
Output	VC (AVC * # units)	FC (TC − VC)	TC (FC + VC)	AVC (VC / # output)	AFC (FC / # output)	ATC (TC / # output)	MC ($TC_{\Delta} - TC_{\Delta-1}$)
0	0	100	100	N/A	N/A	N/A	N/A
1	25	100	125	25	100	125	25
2	45	100	145	22.5	50	72.5	20
3	60	100	160	20	33.33	53.33	15
4	70	100	170	17.5	25	42.5	10
5	90	100	190	18	20	38	20
6	120	100	220	20	16.67	36.67	30
7	165	100	265	23.57	14.29	37.86	45
8	230	100	330	28.75	12.50	41.25	65
9	315	100	415	35	11.11	46.11	85
10	425	100	525	42.5	~~#11~~ 10	52.5	110

MC

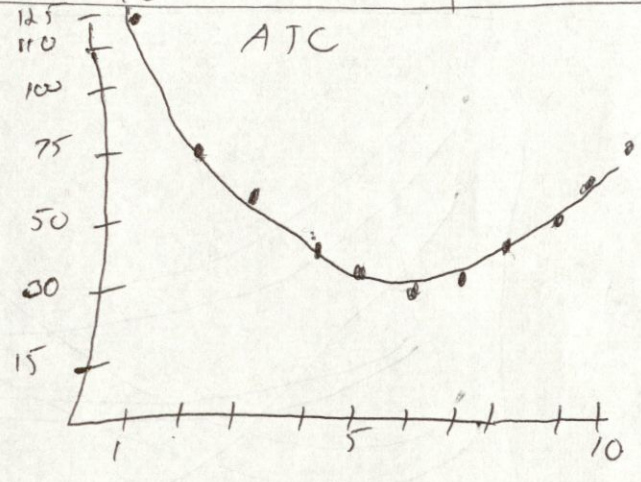
b



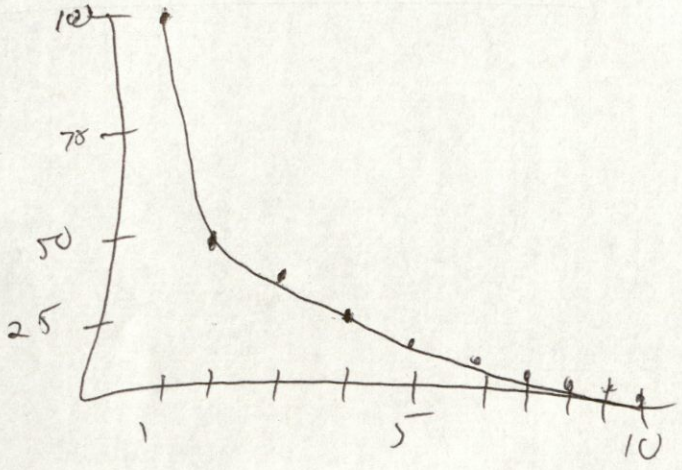
AVC



ATC



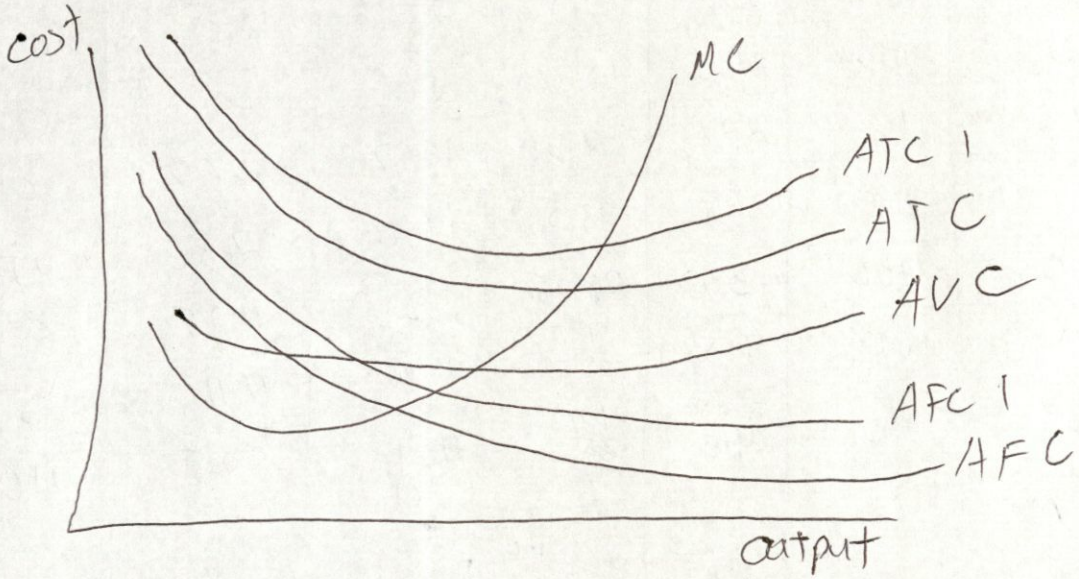
AFC



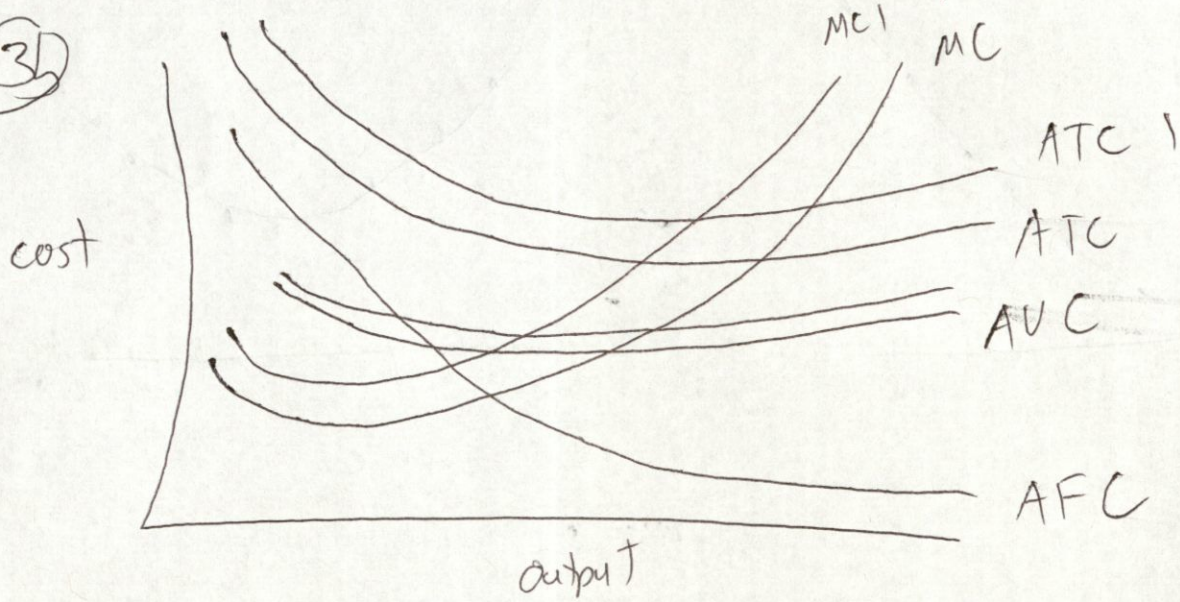
(2c) ~~MC~~

When marginal cost is less than ATC, ATC is falling, When marginal cost is greater than ATC, ATC is rising. The marginal cost curve ~~c~~crosses the ATC curve at the ~~effici~~ quantity that minimizes ATC.

(3a)



(3b)



MC curve, ATC curve, AVC curve and AFC curve.

c. Discuss about some important features of the shape of MC, ATC and the relationship between marginal and ATC. (Hint: textbook p.268-p.271)

3.) QUESTION :

The city government is considering two tax proposals:

- A lump-sum tax of $300 on each producer of hamburgers.
- A tax of $1 per burger, paid by producers of hamburgers.

a. Which of the following curves—average fixed cost, average variable cost, average total cost, and marginal cost—would shift as a result of the lump-sum tax? Why? Show this in a graph. Label the graph as precisely as possible.

b. Which of these same four curves would shift as a result of the per-burger tax? Why? Show this in a new graph. Label the graph as precisely as possible.

SOLUTION :

(GRAPHS ON ATTACHED SHEET)

a) A lunmpsum tax increases the fixed cost component, so there will be a chnage in AFC, and ATC curves. As the AFC and ATC are derived from the FC compenet we can see a shift in these two curves.

b) But for a tax on output, it adds cost to variable costs. So there will be a change in VC occurs, due to this there will be a changes in the AVC, ATC and MC curves takes place as these are derived from VC.

An illustration and graphs of these changes are given ~~below~~. on attached sheet

4.) QUESTION :

Consider the following table of long-run total costs for three different firms:

Quantity	1	2	3	4	5	6	7
Firm A	$60	$70	$80	$90	$100	$110	$120
Firm B	11	24	39	56	75	96	119
Firm C	21	34	49	66	85	106	129

Does each of these firms experience economies of scale or diseconomies of scale?

SOLTUION :

Firm A : Economies of Scale

Firm B : Diseconomies of Scale

Firm C : Economic and Diseconomies of Scale