

Exercise session 3

1)

Hours	Quantity of fish	Marginal Product	Total cost
0	0		10
1	10	10	15
2	18	8	20
3	24	6	25
4	28	4	30
5	30	2	35

Suppose that a fisherman exhibits the relationship between hours spent fishing and the quantity of fish caught as above.

- What is the marginal product of each hour spent fishing?
- Use this data to graph the fisherman's production function. Explain its shape. **Ans: diminishing marginal product.**



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



Linear cost curve reflecting constant marginal cost of production

2) You can choose multiple answers: when the marginal product of labor increases as the amount of labor employed increases,

- a) **the additional worker has made other workers more productive**
- b) the firm also must have increased the amount of capital
- c) the firm is experiencing economies of scale
- d) **there has been an improvement in the available technology**

3)

Q	TC_1	TC_2
0	0	350
1	300	400
2	400	435
3	465	465
4	495	505
5	540	560
6	600	635
7	700	735

The table above gives the short-run and long-run total costs for various levels of output of a certain firm.

- a) Which column, TC_1 or TC_2 , gives long-run total cost, and which gives short-run total cost? How do you know? **Answ: TC_1 is long run, TC_2 short run. Answer is simple, first unit produced has zero TC for TC_1 , implying that there is no fixed cost of production**
- b) For each level of output, find short-run TFC , TVC , AFC , AVC , and MC .

Q	TFC	TVC	AFC	AVC	MC
0	\$350	\$ 0	—	—	
					\$ 50
1	\$350	\$ 50	\$350	\$ 50	
					\$ 35
2	\$350	\$ 85	\$175	\$ 43	
					\$ 30
3	\$350	\$115	\$117	\$ 38	
					\$ 40
4	\$350	\$155	\$ 88	\$ 39	
					\$ 55
5	\$350	\$210	\$ 70	\$ 42	
					\$ 75
6	\$350	\$285	\$ 58	\$ 48	
					\$100
7	\$350	\$385	\$ 50	\$ 55	

- c) At what output level would the firm's short-run and long-run input mixes be the same? **Answ: $Q=3$, where MC is minimal those two curves are touching each other**
- d) Starting from producing two units, the firm's managers decide to double production to four units. So they simply double all of their inputs in the long run. Comment on their managerial skills. **Answ: starting from 2 unit of output until 4, marginal cost is decreasing in the long run, therefore, it makes sense to increase production.**
- e) Over what range of output do you see economies of scale? Diseconomies of scale? Constant returns to scale? **Answ: ATC_2 declines as output raises, therefore it exhibits economies of scale.**

4)

	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

Suppose the table above represents the long run total costs of three different firms. Does each of these firms experience economies of scale or diseconomies of scale?

	Firm A		Firm B		Firm C	
Quantity	TC	ATC	TC	ATC	TC	ATC
1	\$60.00	\$60.00	\$11.00	\$11.00	\$21.00	\$21.00
2	70.00	35.00	24.00	12.00	34.00	17.00
3	80.00	26.67	39.00	13.00	49.00	16.33
4	90.00	22.50	56.00	14.00	66.00	16.50
5	100.00	20.00	75.00	15.00	85.00	17.00
6	110.00	18.33	96.00	16.00	106.00	17.67
7	120.00	17.14	119.00	17.00	129.00	18.43

Firm A has economies of scale because average total cost declines as output increases. Firm B has diseconomies of scale because average total cost rises as output rises. Firm C has economies of scale from one to three units of output and diseconomies of scale for levels of output beyond three units.

5)

Labor	Output	Marginal Product	Variable Cost	Fixed Costs
0	0	---	\$0	\$10.00
1	200	200	\$20.00	\$10.00
2	350	150	\$40.00	\$10.00
3	450	100	\$60.00	\$10.00
4	500	50	\$80.00	\$10.00
5	525	25	\$100.00	\$10.00
6	530	5	\$120.00	\$10.00

- 6) For a given level of output, the short-run total cost of production
- a. always falls below the long-run total cost of production
 - b. always exceeds the long-run total cost of production
 - c. always equals the long-run total cost of production
 - d. may exceed or equal the long-run total cost of production**
 - e. may exceed or fall below the long-run total cost of production

7) If Papagna's Pizza Parlor knows that the marginal cost of the 500th pizza is \$3.00 and that the average total cost of making 499 pizzas is \$3.30, then

- a. average costs are rising at $Q = 500$
- b. average costs are falling at $Q = 500$**
- c. total costs are falling at $Q = 500$
- d. average variable costs must be falling
- e. average variable costs must be rising

8) Klara has been working for an engineering firm and earning an annual salary of \$80,000. She decides to open her own engineering business. Her annual expenses will include \$15,000 for office rent, \$3,000 for equipment rental, \$1,000 for supplies, \$1,200 for utilities, and a \$35,000 salary for a secretary/bookkeeper. Klara will cover her start-up expenses by cashing in a \$20,000 certificate of deposit on which she was earning annual interest of \$500.

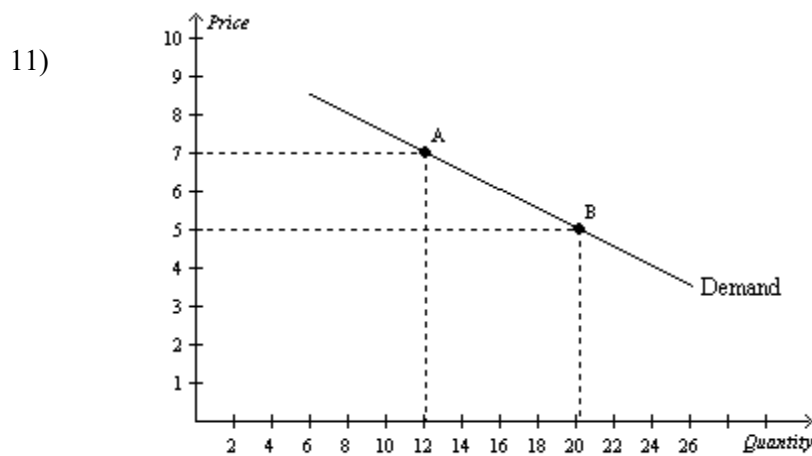
- What is Klara's annual implicit cost? **Answer: $80,000\$ + 500\$ = 80,500\$$**
- What is Klara's annual accounting cost? **Answer: $15,000\$ + 3,000\$ + 1,000\$ + 1,200\$ + 35,000\$ = 55,200\$$.**
- What is Klara's annual economic cost? **Answer: $55,200\$ + 80,500\$ = 135,700\$$**
- According to Klara's accountant, what is the revenue that will yield her business \$50,000 in profits? **Answer: $55,200\$ + 50,000\$ = 105,200\$$.**
- According to an economist, what is the revenue that will yield Klara's business \$50,000 in economic profits? **Answer: $135,700\$ + 50,000\$ = 187,500\$$.**

9) For a particular good, a 2 percent increase in price causes a 12 percent decrease in quantity demanded. Which of the following statements is most likely applicable to this good?

- a. There are no close substitutes for this good.
- b. The good is a luxury.**

- c. The market for the good is broadly defined.
- d. The relevant time horizon is short.

- 10) Studies indicate that the price elasticity of demand for cigarettes is about 0.4. A government policy aimed at reducing smoking changed the price of a pack of cigarettes from \$2 to \$6. According to the midpoint method, the government policy should have reduced smoking by
- a. 30%.
 - b. 40%.**
 - c. 80%.
 - d. 250%.



- i) Between point A and point B, what price elasticity of demand equals to? **1.5**
- ii) Between point A and point B, what the slope equals to? **-1/4**
- iii) Between point A and point B on the graph, demand is
 - a. perfectly elastic.
 - b. inelastic.
 - c. unit elastic.
 - d. elastic, but not perfectly elastic.**

12) For each of three potential buyers of oranges, the table displays the willingness to pay for the first three oranges of the day. Assume Allison, Bob, and Charisse are the only three buyers of oranges, and only three oranges can be supplied per day.

	First Orange	Second Orange	Third Orange
Allison	\$2.00	\$1.50	\$0.75
Bob	\$1.50	\$1.00	\$0.60
Charisse	\$0.75	\$0.25	\$0

- i) If the market price of an orange is \$0.90, then what the market quantity of oranges demanded per day will be? **4**
- ii) If the market price of an orange is \$0.70, then what the market quantity of oranges

demanded per day will be? **6**

- iii) The market quantity of oranges demanded per day is exactly 7 if the price of an orange, P , satisfies
- a. $\$0.60 < P < \0.75 .
 - b. $\$0.60 < P < \2.00 .
 - c. $\$0.25 < P < \0.75 .
 - d. $\$0.25 < P < \0.60 .**
- iv) If the market price of an orange is $\$0.65$, then how much is the consumer surplus? **3.6\$**
- v) If the market price of an orange increases from $\$0.80$ to $\$1.05$, then what happens to consumer surplus? **decreases by $\$0.95$.**
- vi) Who experiences the largest *loss* of consumer surplus when the price of an orange increases from $\$0.70$ to $\$1.40$?
- a. Allison**
 - b. Bob
 - c. Charisse
 - d. All three individuals experience the same loss of consumer surplus.
- vii) Which of the following statements is correct?
- a. Neither Bob's consumer surplus nor Charisse's consumer surplus can exceed Allison's consumer surplus, for any price of an orange.**
 - b. All three individuals will buy at least one orange only if the price of an orange is less than $\$0.25$.
 - c. If the price of an orange is $\$0.60$, then consumer surplus is $\$4.90$.
 - d. All of the above are correct.