

Problem Set #6-Key

Sonoma State University
Economics 305- Intermediate Microeconomics

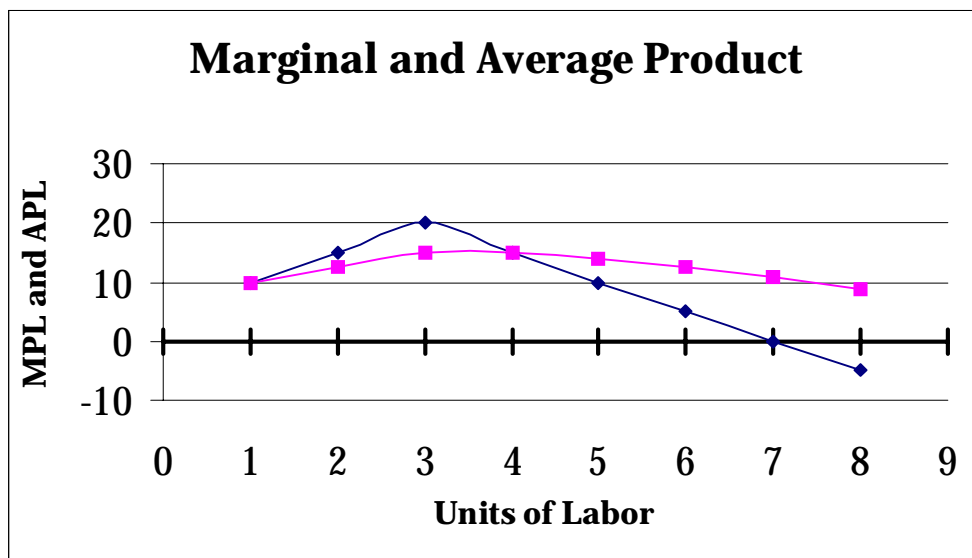
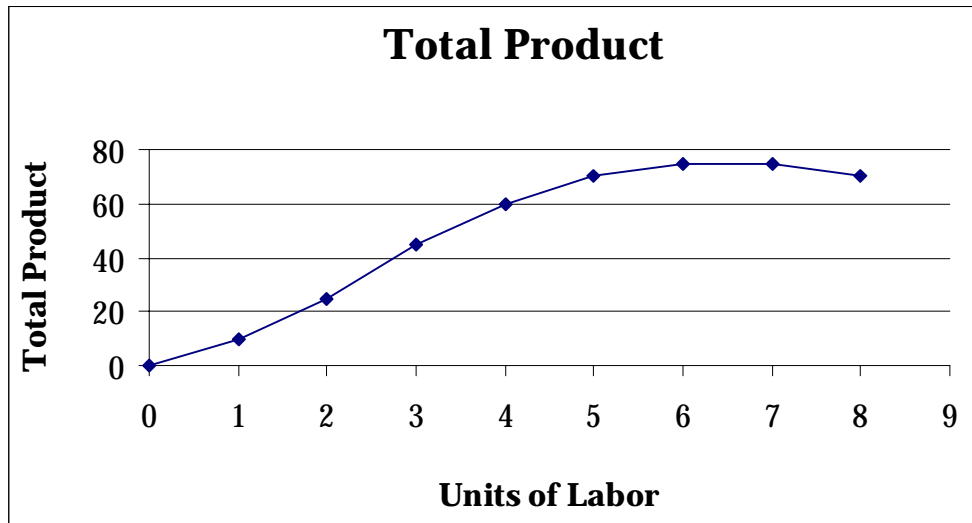
Dr. Cuellar

Based on the data and product and cost curves from problem set four, shown below, answer the following questions.

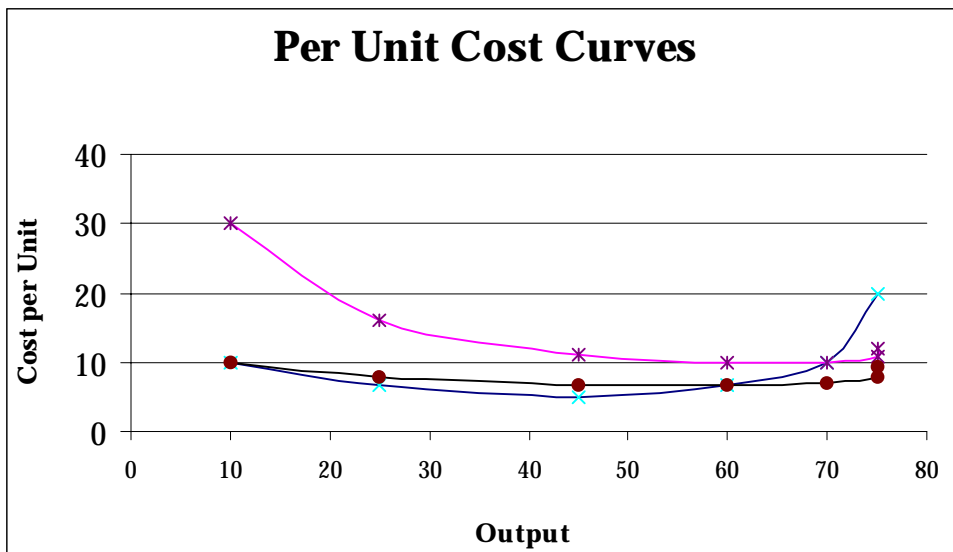
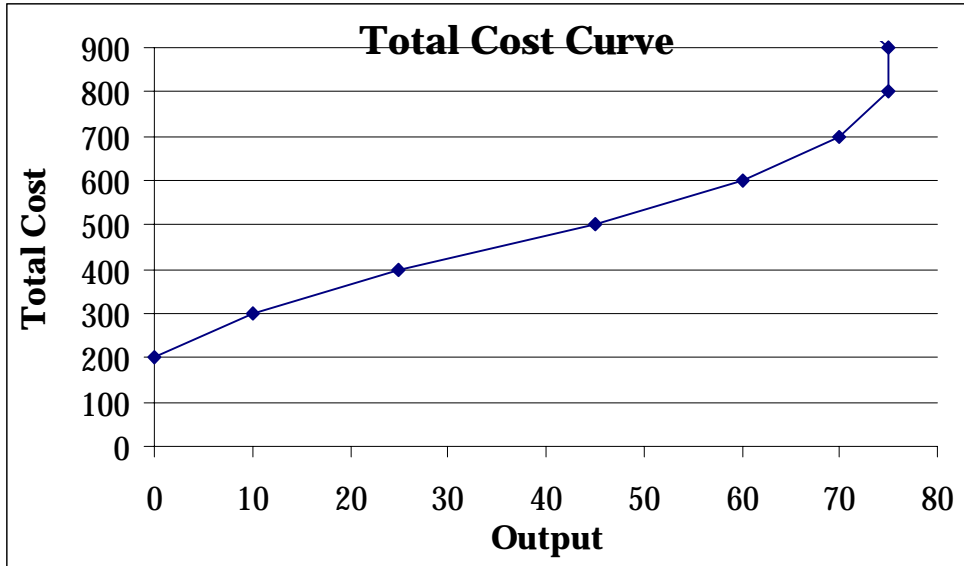
Labor	Product	MP	AP	FC	VC	TC	MC	ATC	AVC
0	0			200	0	200			
1	10	10	10	200	100	300	10.00	30.00	10.00
2	25	15	12.5	200	200	400	6.67	16.00	8.00
3	45	20	15	200	300	500	5.00	11.11	6.67
4	60	15	15	200	400	600	6.67	10.00	6.67
5	70	10	14	200	500	700	10.00	10.00	7.14
6	75	5	12.5	200	600	800	20.00	10.67	8.00
7	75	0	10.714	200	700	900		12.00	9.33
8	70	-5	8.75	200	800	1000	-20.00	14.29	11.43

1-9

Product Curves

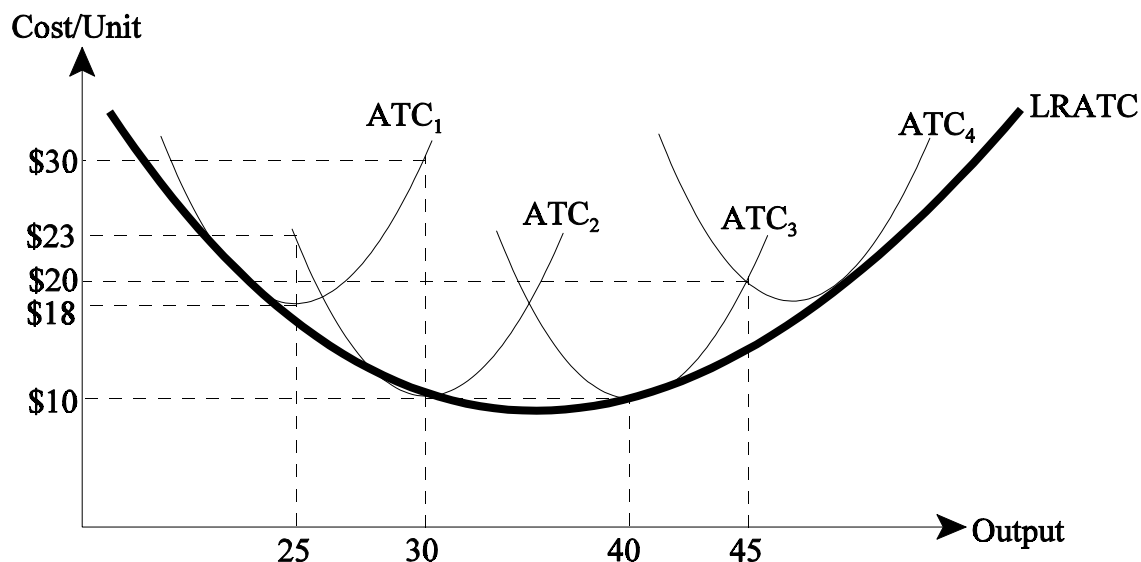


Cost Curves



- (10) At what output is the average product of labor (AP_L) equal to the marginal product of labor (MP_L)? $MP_L = AP_L$ at $Q = 60$.
- (11) What are the implications for the average product of labor when $AP_L = MP_L$? AP_L is at its maximum.
- (12) What is total product when the MP_L is maximized?
 $Q = 45$ when the MP_L is maximized.
- (13) What is total product when the MP_L is zero?
 $Q = 75$ when $MP_L = 0$.

- (14) Assuming a constant price, how many workers should be hired if the firm wants to maximize total revenue?
The firm should maximize output, so they should hire 6 workers.
- (15) At the output at which the marginal product of labor is maximized, what is happening to marginal cost?
When the marginal product of labor is maximized, marginal cost is minimized.
- (16) At what output is marginal cost equal to average total cost? What are the implications for average total cost of the previous question?
 $MC = ATC$ when $Q = 70$. When $MC = ATC$, ATC is at its minimum.
- (17) At what output is marginal cost equal to average variable cost? What are the implications for average variable cost of the previous question?
 $MC = AVC$ when $Q = 60$. When $MC = AVC$, AVC is at its minimum.
- (18) What is the per unit cost of producing 60 units of output? $ATC(60) = \$10$
- (19) What is the per unit labor cost of producing 60 units of output? $AVC(60) = \$6.67$
- (20) What is the per unit fixed cost of producing 60 units of output? $AFC(60) = \$3.33$



Suppose that a firm has four possible scales of production. Figure One shows the four short run average total cost curves for the respective firm sizes represented by ATC_1 through ATC_4 .

- (21) Which scale of production is best when output, $Q = 25$? Based on your previous answer, what is the per unit cost of producing 25 units?
The firm should use the scale of production associated with ATC_1 . $ATC(25) = \$18.00$.
- (22) Which scale of production is best when output, $Q = 30$? Based on your previous answer, what is the per unit cost of producing 30 units?
The firm should use the scale of production associated with ATC_2 . $ATC(30) = \$10.00$.
- (23) Which scale of production is best when output, $Q = 40$? Based on your previous answer, what is the per unit cost of producing 40 units?
The firm should use the scale of production associated with ATC_3 . $ATC(40) = \$10.00$.
- (24) Which scale of production is best when output, $Q = 45$? Based on your previous answer, what is the per unit cost of producing 45 units?
At $Q = 45$, the firm is indifferent between ATC_3 and ATC_4 . $ATC(45) = \$18.00$ at both scales of production.
- (25) Identify the long run average cost curve from Figure One. See graph.
- (26) Over what output range (approximately) on the long run average cost curve are increasing returns to scale illustrated? 0-30 units.
- (27) Over what output range (approximately) on the long run average cost curve are decreasing returns to scale illustrated? 40 and beyond.
- (28) Over what output range (approximately) on the long run average cost curve are constant returns to scale illustrated? 30-40 units.