

KEY

ECO 610
Fall 2017
Problem Set #4

1. (6 pts.) Labor and capital are used to produce widgets according to the production table below:

		Labor Input				
		L=1	2	3	4	5
Capital Input	K=1	Q=20	40	55	65	75
	2	40	60	75	85	90
	3	55	75	90	100	105
	4	65	85	100	110	115
	5	75	90	105	115	120

Per unit-prices for labor and capital are $w = \$40$ and $v = \$40$. For this particular production function, when both input prices are the same, the long-run least-cost combination of inputs occurs where $K = L$. Using this information, graph five points on this firm's long-run average cost curve in the attached diagram. Be sure to point out if there are economies or diseconomies of scale, and indicate the minimum efficient scale of production.

LRAC: ATC is minimized when $L = K$

<u>L</u>	<u>K</u>	<u>Q</u>	<u>TC</u>	<u>ATC</u>		
1	1	20	80	\$4.00	①	(points on graph on next page)
2	2	60	160	2.67	②	
3	3	90	240	2.67	③	
4	4	110	320	2.91	④	
5	5	120	400	3.33	⑤	

2. (4 pts.) Suppose you have chosen $K = 3$ and are stuck with that plant size in making short-run production decisions. If you want to produce $Q = 55$, how would you do it and what would your per-unit costs be? If you wanted to produce $Q = 105$, how would you do it and what would your per-unit costs be? Graph these two points on the firm's short-run average total cost curve for plant size $K = 3$. Hint: there is a third point on this SRATC curve that you have already calculated from above. Make sure your SRATC curve reflects this.

SRAC: K is fixed at $\bar{K} = 3$

(points on graph)	⑥	$L = 1$	$\bar{K} = 3$	$Q = 55$	$TC = 160$	$SRATC = \$2.91$
	④	$L = 3$	$\bar{K} = 3$	$Q = 90$	$TC = 240$	$SRATC = LRAC = \$2.67$
	⑦	$L = 5$	$\bar{K} = 3$	$Q = 105$	$TC = 320$	$SRATC = 3.05$

