

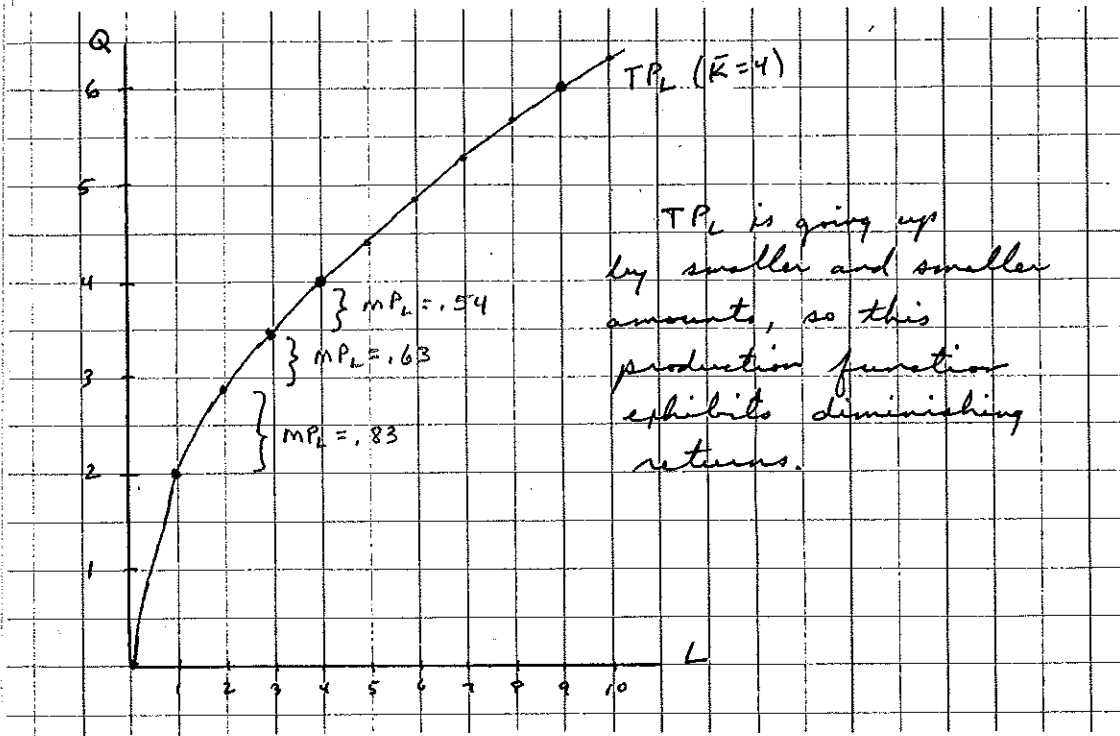
(4 pts) 1.

$$Q = L^{1/2} K^{1/2}$$

if K is fixed at $K=4$, then $Q = 2L^{1/2}$

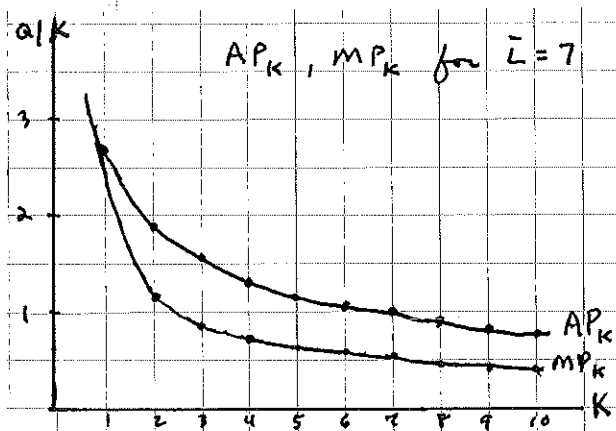
$$MP_L = \frac{dQ}{dL} = \frac{1}{2} \cdot 2 \cdot L^{-1/2} = \frac{1}{\sqrt{L}}$$

$$TP_L = Q = 2L^{1/2}$$



(4 pts) 2.

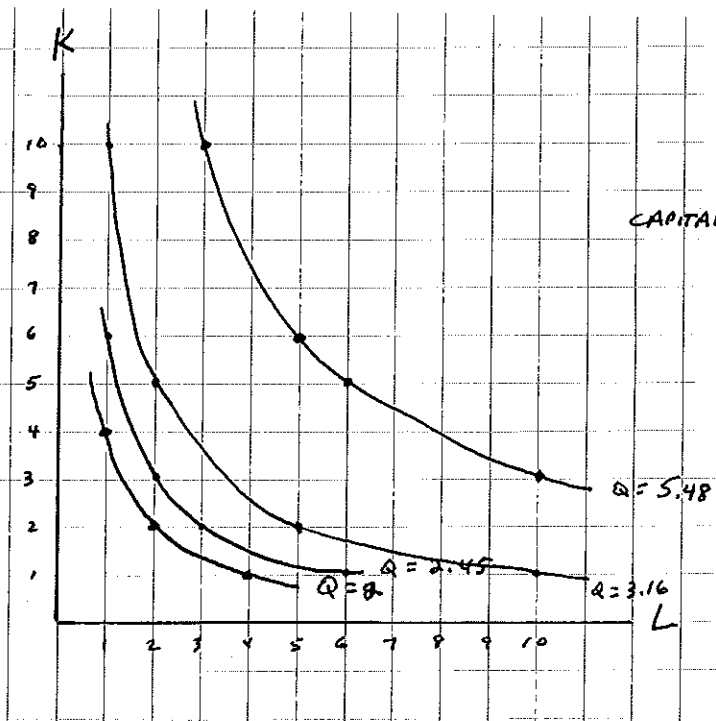
$$Q = \sqrt{7} \cdot K^{1/2} = 2.65 K^{1/2}$$



when L is fixed at 7, there are diminishing returns to capital!

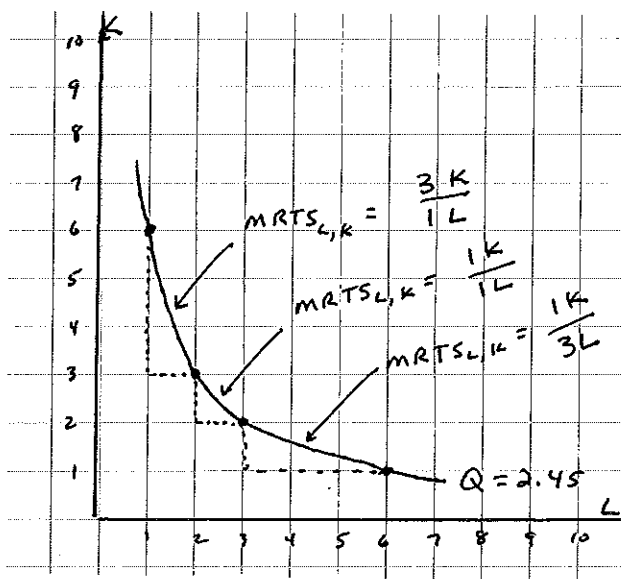
K	Q	AP _K	MP _K
1	2.65	2.65	2.65
2	3.74	1.87	1.09
3	4.58	1.526667	0.84
4	5.29	1.3225	0.71
5	5.92	1.184	0.63
6	6.48	1.08	0.56
7	7	1	0.52
8	7.48	0.935	0.48
9	7.94	0.882222	0.46
10	8.37	0.837	0.43

(4 pts.) 3.



	LABOR										
CAPITAL	0	1	2	3	4	5	6	7	8	9	10
1	1.00	1.41	1.73	2.00	2.24	2.45	2.65	2.83	3.00	3.16	
2	1.41	2.00	2.45	2.83		3.46	3.74	4.00	4.24	4.47	
3	1.73	2.45	3.00	3.46	3.87	4.24	4.58	4.90	5.20	5.48	
4	2.00	2.83	3.46	4.00	4.47	4.90	5.29	5.66	6.00	6.32	
5	2.24		3.87	4.47	5.00	5.48	5.92	6.32	6.71	7.07	
6	2.45	3.46	4.24	4.90	5.48	6.00	6.48	6.93	7.35	7.75	
7	2.65	3.74	4.58	5.29	5.92	6.48	7.00	7.48	7.94	8.37	
8	2.83	4.00	4.90	5.66	6.32	6.93	7.48	8.00	8.49	8.94	
9	3.00	4.24	5.20	6.00	6.71	7.35	7.94	8.49	9.00	9.49	
10		4.47	5.48	6.32	7.07	7.75	8.37	8.94	9.49	10.00	

(4 pts.) 4.



On the $Q = 2.45$ isoquant, the $MRTS_{L,K}$ declines from 3 to 1 to $1/3$ as we use less and less capital and more and more labor.

(4 pts.) 5.

	Labor										
Capital	0	1	2	3	4	5	6	7	8	9	10
1	1.00	1.41	1.73	2.00	2.24	2.45	2.65	2.83	3.00	3.16	
2	1.41	2.00	2.45	2.83	3.16	3.46	3.74	4.00	4.24	4.47	
3	1.73	2.45	3.00	3.46	3.87	4.24	4.58	4.90	5.20	5.48	
4	2.00	2.83	3.46	4.00	4.47	4.90	5.29	5.66	6.00	6.32	
5	2.24	3.16	3.87	4.47	5.00	5.48	5.92	6.32	6.71	7.07	
6	2.45	3.46	4.24	4.90	5.48	6.00	6.48	6.93	7.35	7.75	
7	2.65	3.74	4.58	5.29	5.92	6.48	7.00	7.48	7.94	8.37	
8	2.83	4.00	4.90	5.66	6.32	6.93	7.48	8.00	8.49	8.94	
9	3.00	4.24	5.20	6.00	6.71	7.35	7.94	8.49	9.00	9.49	
10	3.16	4.47	5.48	6.32	7.07	7.75	8.37	8.94	9.49	10.00	

Constant returns to scale: as we double the usage of labor and capital, output exactly doubles.
 $L=1, K=1, Q=1$
 $L=2, K=2, Q=2$
 etc.