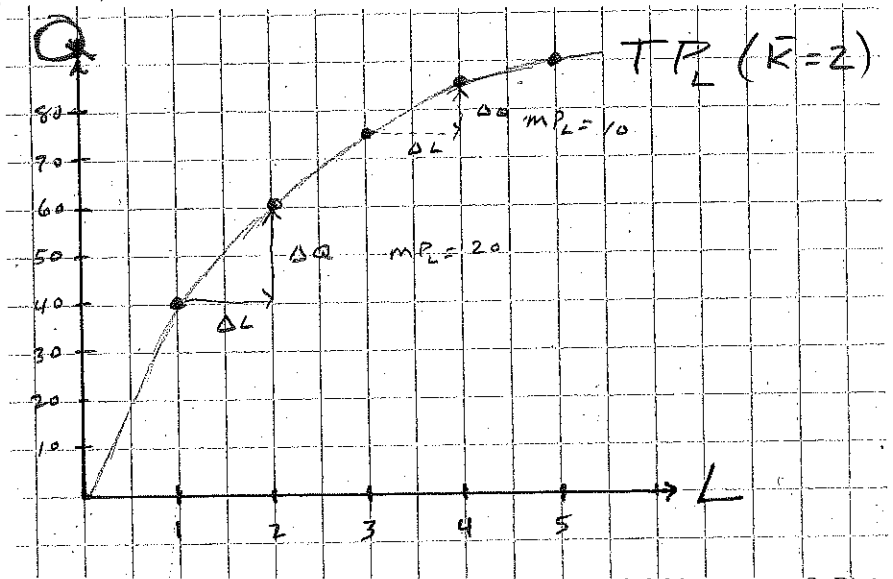


Problem Set #3 Key: **2 points for each part, 6 points total.**

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

		Labor Input				
		1	2	3	4	5
Capital Input	1	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

a) Draw the TP_L curve when K is fixed at 2 in the short run.



b) Does this production process exhibit diminishing returns? Pick a set of combinations of inputs to illustrate and explain your answer.

As more units of labor are added to a fixed amount of capital, the marginal product of labor will eventually decrease. In this case diminishing returns set in with the first unit of labor. MP_L when $K=2$ is:

L	0	1	2	3	4	5
Q	0	40	60	75	85	90
MP_L		40	20	15	10	5

c) Does this production function exhibit increasing, constant, or decreasing returns to scale? Pick a set of combinations of inputs to illustrate and explain your answer.

Returns to scale is a long-run phenomenon and involves changing all inputs by the same proportion. When $K=1$ and $L=1$, then $Q=40$. When K and L are both doubled such that $K=2$ and $L=2$, then $Q=60$, or more than doubles. Hence increasing returns to scale. When K and L are doubled again, such that $K=4$ and $L=4$, $Q=110$. Less than doubling means decreasing returns to scale over this range.