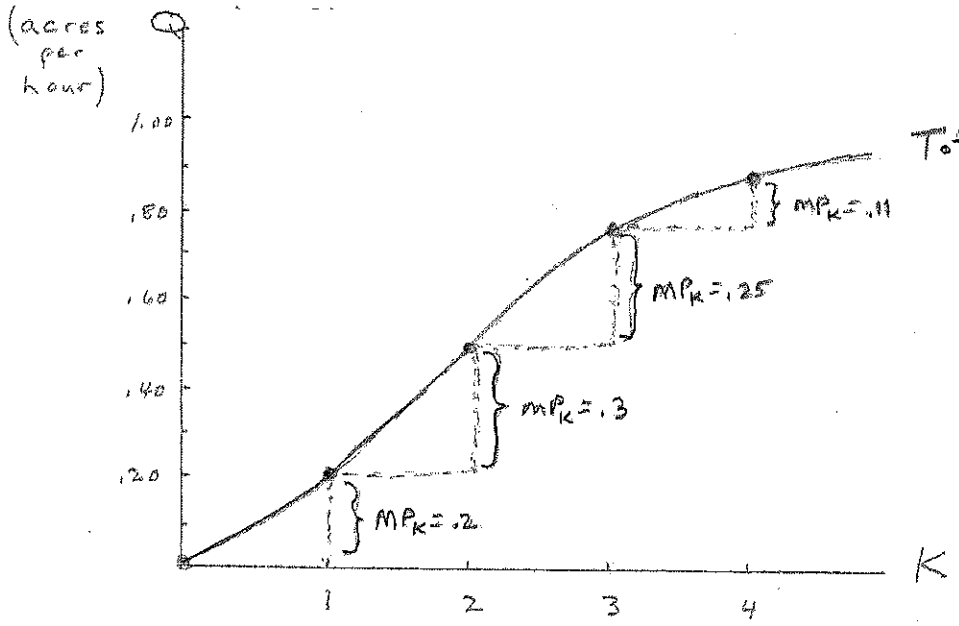
KEY

ECO 610
Fall 2017
Problem Set #3

10 pt. total

1. You have bought a new house with a one-acre lot that has to be mowed on a regular basis. You plan on doing the job yourself, but need to buy a lawn mower. After some research you figure out the following: If you buy a push reel-type mower (K=1), you can mow one acre of grass in five hours (300 minutes). If you buy a gas-powered push mower (K=2), you can mow one acre in two hours (120 minutes). Your labor combined with a gas-powered self-propelled mower (K=3) gets an acre of grass mowed in 80 minutes. You sitting on a small lawn tractor (K=4) accomplishes the one-acre job in 70 minutes. Do you see the law of eventually diminishing marginal returns at work in this production experiment? To fully explain your answer, you should keep the labor input fixed at one person-hour, and calculate how many acres of grass one person-hour of L can produce when combined with increasing amounts of K. Illustrate in the diagram below and refer to your graph in explaining your answer.

5 pts.



K	L	Q
1	5	1 acre
2	2	1
3	1.33	1
4	1.16	1

K	L	Q	
0	1	0 acres	
1	1	.20	> .20
2	1	.50	> .30
3	1	.75	> .25
4	1	.86	> .11

$MP_K = \frac{\Delta Q}{\Delta K}$

As more and more units of K are added to a fixed amount of L, output eventually increases at a decreasing rate ⇒ diminishing returns to capital.

2. You decide to go with the small lawn tractor, but before you buy it the owner of a landscape company approaches you and offers to mow your grass for the entire season for $1500. Another decision to make! You can purchase a small lawn tractor for $1000. After using it for a season you could sell it for $750. You anticipate spending $100 for gas, oil, and maintenance on the mower for the season. You would have to take the purchase price out of your Credit Union account where it is earning 5%. If you mow your own yard, you can count on spending 20 hours keeping your grass cut until it stops growing sometime in mid-November. You value your leisure time at $50 per hour. Your neighbor, who makes twice as much money as you do, highly recommends the landscape company.. What is right for you?

5 pts.

Economic costs of owning a mower and cutting your own grass for the year:

① You lose the use of $1000 for the year because it is tied up in a lawn tractor.

0.05 * $1000 = $50 interest earnings foregone

② at the end of the year the asset that you own is not worth as much as it was at the beginning of the year.

$1000 - $750 = $250 economic depreciation of the asset

③ operating expenses - an explicit cost

gas, oil, maintenance = $100

④ opportunity cost of your time spent mowing vs. playing golf or whatever else amuses you.

20 hours * $50/hr = $1000

Total economic cost of mowing your own yard = 50 + 250 + 100 + 1000 = $1400.00

which is cheaper than outsourcing this task to someone else for $1500.