Problem Set #5
PAI 897
Professor John McPeak

Name: KEY

1) Complete the following table.

Output	Fixed Cost	Average Fixed Cost	Total Cost	Variable Cost	Average Cost	Ave. Variable Cost	Marginal Cost
0	12	NA	12	NA	NA	NA	NA
1	12	12	23	11	23	11	11
2	12	6	33	21	16 1/2	10.5	10
3	12	4	44	32	14 2/3	10 2/3	11
4	12	3	56	44	14	11	12
5	12	2.4	69	57	13.8	11.4	13
6	12	2	84	72	14	12	15
7	12	1.7	101	89	14.4	12.7	17
8	12	1.5	121	109	15.1	13.6	20

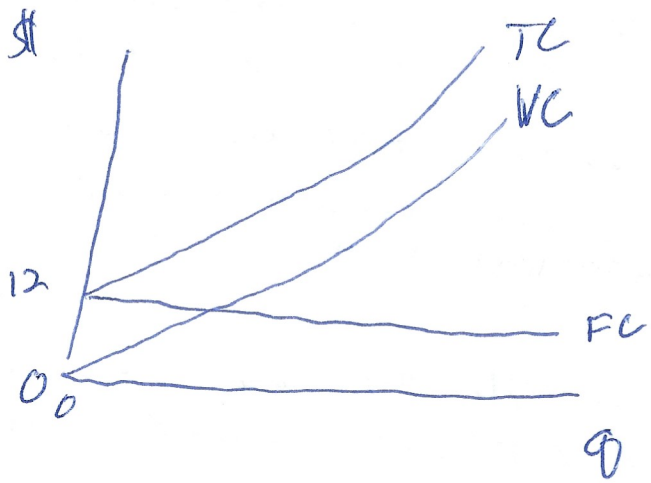
a) Is this a short run or long run information on cost? Why?

Short run because there are fixed costs. In the long run all costs are variable.

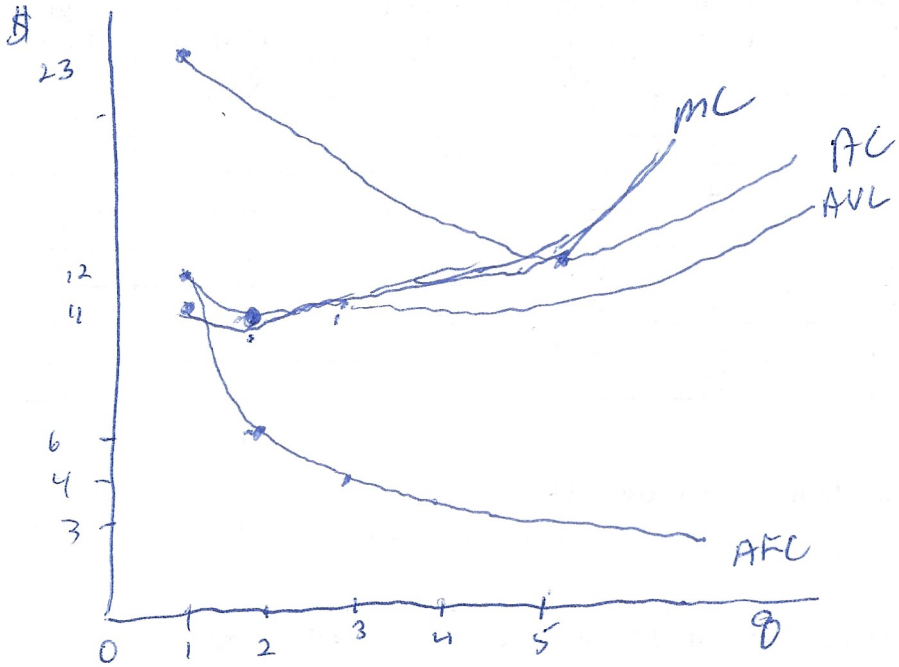
b) If the price of the good produced is currently 13, what level of output is the profit maximizing level?

1) $P = MC(q)$, $13 = MC(q=5)$, $q=5$
2) $P = 13 > AVC(q=5) = 11.4$ (or) $\Pi(q=5) = 13.5 - 69 = -4$
$\Pi(q=0) = 0 - 12 = -12$
The firm is better off producing $q=5$ and getting $\Pi = -4$ than shutting down with $q=0$ and getting -12.

c) Draw the fixed cost, the variable cost, and total cost based on the information in this table.



2) Using the information in the table in problem one, draw an average variable cost curve, an average fixed cost curve, an average cost curve and a marginal cost curve on a single graph. Explain the reasons for the shape of each, and the implications of where the curves cross each other.



MC crosses AVC from below at the minimum of AVC

MC crosses AC from below at the minimum of AC

when MC is below AVC, AVC is decreasing. when MC is above AVC, AVC is increasing. when MC is below AC, AC is decreasing. when MC is above AC, AC is increasing.

3) Define the seven short run cost concepts.

FC - Fixed costs are costs of inputs that do not change as output changes

VC - variable costs are costs of inputs that do change as output changes

TC - Total cost = Fixed cost + variable cost

AFC - Average Fixed cost is Fixed cost divided by Q

AVC - Average variable cost is Variable cost divided by Q

AC - Average cost is Total cost divided by Q

MC - Marginal cost is the change in total cost divided by the change in Q (also change in variable cost divided by change in Q)

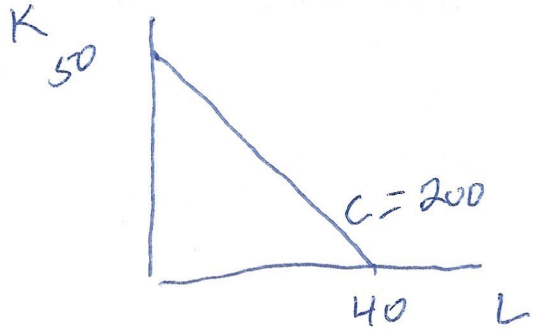
Which of these are applicable in the long run? Why?

AC, TC, MC.

All of the other cost concepts are based on a distinction between fixed cost and variable cost. In the long run all costs are variable costs.

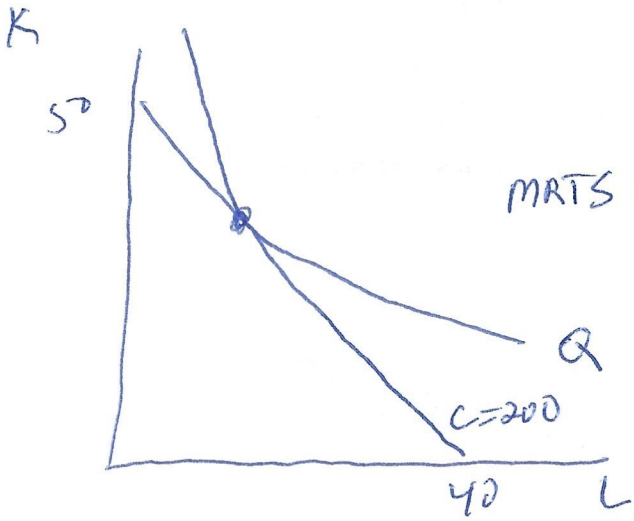
4) Assume the rental rate of capital is 4, and the wage rate is 5.

a. Draw an isocost curve for a cost level of 200.



r=4
w=5
C=200

b. Repeat your graph from (a) and add in an isoquant tangent to the isocost for $200. What should the marginal rate of technical substitution be at an economically efficient bundle?



$MRTS = \frac{-w}{r} = -\frac{5}{4} = -1.25$

5) My variable cost of producing rakes is $5,000 per day, and the fixed costs of running my rake factory are $120,000 per 30 day month (we work every day). Below what level of revenue would I be better off shutting down and not producing any rakes?

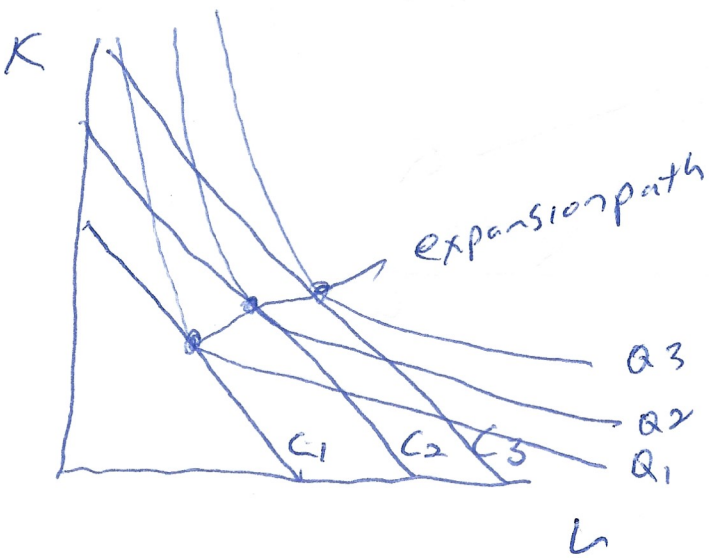
Below $5,000 per day you do not have enough revenue to cover variable costs and should shut down and produce $q = 0$

6) Describe the expansion path.

a. Define the expansion path.

The line tracing out cost minimizing ways of producing output — the points of tangency of isocosts with isoquants.

b. Illustrate on a graph how the expansion path is derived.



$C_1 < C_2 < C_3$

$Q_1 < Q_2 < Q_3$

c. Are there points on the expansion path that are technically efficient but are not economically efficient? Why or why not?

No, all points on the expansion path are both technically efficient (on an isoquant) and economically efficient (at a point of tangency between an isocost and an isoquant).

d. Can we identify a profit maximization point based on the information contained in the expansion path? Why or why not?

no, we don't know the selling price of the good we are producing.