

Econ 100A: Intermediate Microeconomics
 Problem Set 4
 Due in class Monday November 21

1. A firm uses capital and labor to produce output. The production function is given by $f(K, L) = K^{1/2}L^{1/2}$.
 - (a) Find the firm's conditional factor demand functions when $r=10$, $w=20$.
 - (b) Write the firm's cost function. Draw the average cost curve.
 - (c) Based on initial projections for demand, the firm anticipated the need to produce 200 units the following year. How much capital would the firm install? If the output target were to change, how does the firm's demand for labor depend on desired output in the short-run?
 - (d) Based on your answer to (c), what is the firm's cost function in the short-run? Find the short-run average cost function and graph it along with the long-run average cost curve you found in part b.

2. Suppose a firm's cost function is given by $C(y) = 2y^2 - 4y + 8$.
 - (a) Find marginal cost, average cost, average fixed cost, and average variable cost. Draw what these approximately look like these on a graph. At what output is marginal cost equal to average variable cost? (Note that this is also the point where AVC is at a minimum)
 - (b) The firm sells output at price p . Write down the firm's profit function, and find the equation that represents the firm's inverse supply curve.
 - (c) Draw the firm's supply curve on a graph. Take care to account for where the firm would choose to shut down.
 - (d) At what price would the firm choose to supply 6 units of output? On a graph, again draw the firm's marginal cost curve and shade the area representing producer surplus at this price and quantity.

3. A good is produced by a constant-cost industry. Market demand for the good is $Q_D(P) = 60-2P$. The long run total costs for each firm in the industry are given by:

<u>Output</u>	<u>Total Cost</u>
0	0
1	10
2	16
3	21
4	32
5	45
6	66
7	91
8	112

- a. What is the long-run equilibrium price?
- b. What is the quantity produced by each firm?
- c. What is the long-run industry level of production?
- d. What is the number of firms in the long-run?