

Eco 300. Intermediate Microeconomics  
Homework 4

1. A firm's total cost curve is given by  $TC(q) = q(q - 4)^2 + 2q$ .
  - a) What is the formula for its  $AC$  curve?
  - b) Marginal costs are given by  $MC(q) = 3q^2 - 16q + 18$ . Graph this together with the  $AC$  curve.
  
2. Trapper Joe, the fur trader, has found that his production function in acquiring pelts is given by  $q = 2\sqrt{H}$  where  $q$  =the number of pelts acquired in a day, and  $H$  =the number of hours Joe's employees spend hunting and trapping in one day. Joe pays his employees \$8 an hour.
  - a) Calculate Joe's total and average cost curves (as a function of  $q$ ).
  - b) What is Joe's total cost for the day if he acquires four pelts? Six pelts? Eight pelts? What is Joe's average cost per pelt for the day if he acquires four pelts? Six pelts? Eight pelts?
  - c) Graph the cost curves from part a and indicate the points from part b.
  
3. Suppose that a firm faces a demand curve that has a constant elasticity of  $-2$ . This demand curve is given by  $q = 256/P^2$ . Suppose also that the firm has a marginal cost curve of the form  $MC = 0.001q$ .
  - a) Graph these demand and marginal cost curves.
  - b) Calculate the marginal revenue curve associated with the demand curve; graph the curve.
  - c) At what output level does marginal revenue equal marginal cost?
  
4. Assume that a firm acts as a price taker. Regardless of the demand, it sells each unit of its product for \$5.
  - a) Assume that the firm's marginal cost is given by  $MC = 0.2q + 3$ . What is the level of output  $q$  that maximizes profit?
  - b) Assume the total cost is given by  $TC = 0.1q^2 + 3q + 10$ . Calculate the firm's profit.
  - c) Graph these results and label firm's supply curve.
  
5. Suppose that a firm faces the demand curve of the form  $q = 60 - 2p$ .
  - a) Write down the total revenue curve as a function of  $q$ .
  - b) Assume  $MC = 0.2q$  and  $MR = 30 - q$ . What output level should the firm produce to maximize profits?
  - c) Graph the demand,  $MC$ , and  $MR$  curves and the point of profit maximization.