

Economics 308: Intermediate Microeconomics  
Department of Economics, Finance and Legal Studies  
University of Alabama  
Spring, 2013

Midterm II

The exam is worth 100 points. Each question (six questions on six pages) is of equal value. There will be no communication with the exam proctors; if you believe a question contains an error or ambiguity, say so on your written examination, make an assumption to correct the alleged error or to resolve the ambiguity, and answer the question as well as you can.

1. Should a competitive firm ever produce when it is losing money? Why or why not? Use a graph to help explain your answer.
2. True or False (Explain briefly and use an example and/or state assumptions if necessary)? If marginal cost is increasing, then average cost is necessarily increasing as well (use a graph).
3. A firm purchases capital and labor in competitive markets at prices of  $r=4$  and  $w=6$ , respectively. With the firm's current input mix, the marginal product of capital is 16 and the marginal product of labor is 12. Is this firm minimizing its costs? If so, explain how you know. If not, explain what the firm ought to do.
4. A machine that costs \$90 will yield returns of \$50 at the end of each of the next 2 years, at which time it will be sold as scrap for \$30. In addition, the maintenance cost of the machine is \$20 in each of the next 2 years. If the interest rate facing this firm is 100 percent (note that it does not change over time), should the firm purchase this machine?
5. This question involves two parts regarding returns to scale.
  - (a) Consider the following production function:  $q = K^{1/3}L^{1/3}$ . Show whether this production function exhibits increasing, decreasing or constant returns to scale?
  - (b) Consider the following production function:  $q = K^{1/3}L^{1/3} + K^{2/3}$ . Show whether this production function exhibits increasing, decreasing or constant returns to scale?
6. Suppose we know the demand curve for widgets is  $P = 10 - (q/10)$  and that the marginal cost (which we assume to be constant) for widgets is 4.
  - (a) State the necessary condition for *profit* maximization (the one relevant to the information given here)? Find  $q^*$  given this condition (and show on a graph)
  - (b) State the necessary condition for *revenue* maximization? Find  $q^{**}$  given this condition (and show on the same graph you used in part a).