

Name _____

1. Suppose a firm produces a single output with a single variable input (labor). The production function is given by $Q = 24L + 2L^2 - L^3$ and the firm takes the price of its product as given: $P = 5$. The firm also takes the price of labor (w) as given.
 - a. (2 points) Find expressions for the value of the marginal product of labor (VMP_L) and the value of the average product of labor (VAP_L).
 - b. (4 points) For what values of the wage rate w will the firm hire zero units of labor?
 - c. (6 points) Suppose the wage rate is $w = 20$. Find the profit-maximizing amount of labor to hire. (Make sure you check all the conditions for profit maximization.)
2. (12 points) Suppose a firm produces an output Q with total cost function $C(Q)$ and takes the price of its product P as given. Using words, graphs, and calculus, carefully explain the conditions that must hold if the firm maximizes profit. In particular, explain when (and why) the firm should “shut down.” Then use your analysis to explain how the firm’s supply curve for its output is determined. Must the supply curve be upward sloping? Explain.
3. (6 points) Starting from isoquants and isocost curves, use words and graphs to explain how the firm’s long run total curve curve is derived.
4. (3 points) What is the difference between equilibrium and efficiency? Explain.
5. (3 points) What is consumer surplus, and why is it an appropriate measure of welfare for consumers?
6. (7 points) Write two or three paragraphs to explain the effects of imposing a production quota in a competitive market at a level below the competitive quantity. Accompany your explanation with a graph. Does it make any difference whether or not the right to sell the good can be bought and sold? Explain.
7. (7 points) Write two or three paragraphs to explain the effects of imposing a price ceiling in a competitive market at a level below the market-clearing price. Accompany your explanation with a graph. Does it become uncertain why gets to buy or who gets to sell? How does this uncertainty affect your analysis? Explain.