

Name \_\_\_\_\_

1. (12 points) Consider the endowment model, i.e., the model in which the consumer is endowed with  $\omega_1$  units of good one and  $\omega_2$  units of good two. Discuss the income and substitution effects of an increase in the price of good one. Use words and graphs, and consider separately the cases where the individual is a net seller or a net buyer of good one. Use your answers to discuss the shapes of the net supply curve and the net demand curve. Explain carefully.
2. (13 points) Consider the model of consumption over time. (Let  $c_1$  and  $c_2$  be consumption in years one and two. Income is  $m_1$  in year one and  $m_2$  in year two. Utility is  $U(c_1, c_2)$  and the interest rate is  $r$ .) Explain how the budget constraint is determined. Then use words, graphs, and calculus to explain how an individual decides how much to either lend or borrow.
3. (13 points) Suppose labor  $L$  is the only variable input. The production function  $Q(L)$  has the following properties:  $Q(0) = 0$  and the slope of  $Q(L)$  first increases and then decreases as labor input increases. Suppose the price of labor is given by  $w$  and fixed cost is some positive number  $F$ . Draw the shapes of  $AP_L$ ,  $MP_L$ ,  $C(Q)$ ,  $MC$ ,  $AC$ , and  $AVC$  on as many graphs as necessary. Label all the axes correctly, and briefly explain how you determined each shape.
4. (4 points) Why does  $AVC = w/AP_L$ ? Explain.
5. (4 points) Suppose the production function is  $Q = L^{1.5}$ . Does the law of diminishing returns hold? Explain.
6. (4 points) What is an isoquant? What is the *meaning* of the slope of the isoquant? Explain.