

Due Date: Friday, September 16th

1) Use the neoclassical theory of distribution to predict the impact on the real wage and the real rental price of capital of each of the following events (illustrate graphically, using two graphs for each case, one for the labor market and one for the capital market, and explain in one or two sentences):

- a. A wave of immigration increases the labor force.
- b. An earthquake destroys some of the capital stock.
- c. A technological advance improves the production function.

2) Suppose that the production function is Cobb-Douglas. That is, the production function is $Y = F(K, L) = AK^\alpha L^{1-\alpha}$.

- a) Solve for the fraction of income paid to capital (show your work).
- b) Say $\alpha = 0.3$, and suppose that immigration raises the labor force by 10 percent. What happens to total output (in percentage change)? The real rental price of capital (in percentage change)? The real wage (in percentage change)?
- c) Say $\alpha = 0.3$, and suppose that a gift of capital from abroad raises the capital stock by 10 percent. What happens to total output (in percentage change)? The real rental price of capital (in percentage change)? The real wage (in percentage change)?
- d) Say $\alpha = 0.3$, and suppose that a technological advance raises the value of the parameter A by 10%. What happens to total output (in percentage change)? The real rental price of capital (in percentage change)? The real wage (in percentage change)?

- 3 a) Suppose an automobile manufacturer is choosing between two production options. It can produce 100 cars with 200 workers and 50 machines, or it can produce 166 cars with 300 workers and 75 machines. Would you describe the manufacturer's production function as exhibiting decreasing, constant, or increasing returns to scale? Explain.
- b) *Regardless* of what your answer was in part a, we can say that this manufacturer faces diminishing marginal productivity for both machines and workers. Explain how this is possible.

4) Consider two competitive economies that have the same quantities of labor ($L = 400$) and capital ($K = 400$), and the same technology ($A = 100$). The economies of the countries are described by the following Cobb-Douglas production functions:

North Economy: $Y = AL^{0.3}K^{0.7}$

South Economy: $Y = AL^{0.7}K^{0.3}$

- a) Which economy has the larger production? Explain.
- b) In which economy is the marginal product of labor larger? Explain.
- c) In which economy is the real wage larger? Explain.
- d) In which economy is labor's share of income larger? Explain.