

Name \_\_\_\_\_

Due February 20, 2017

1. Given the following one period model with no capital (slightly different from the one in Chapter 2 and 3 where there is capital but it is fixed).

Utility is log linear in consumption,  $c$ , and leisure,  $x$ . The explicit form is  $U(c,x) = \log(c) + \alpha \log(x)$ .

The production function is a linear function of a productivity factor ( $A$ ) times the labor input,  $l$ .  $c = Al$

(Note that this is Cobb-Douglas with an exponent of 1 on the labor input.)

As usual, time available,  $T$ , is just equal to labor plus leisure,  $T = l + x$ .

- a. Take first order conditions and calculate the marginal rate of substitution between leisure and consumption.
  - b. Show that the labor supply is independent of the productivity parameter.
  - c. Set up the decentralized model and show that the marginal product of labor is equal to the wage rate.
  - d. Given values for parameters,  $\alpha = 0.5$ ,  $A=1$  and  $T=1$ , calculate the steady state values for  $c$ ,  $l$  and  $x$ .
  - e. What happens to  $c$ ,  $l$ , and  $x$  when we double productivity,  $A$ ?
2. Why does a labor tax cause a bigger drop in utility than does a tax on goods in the one period model of Chapter 2-3? Which delivers greater revenue for the government, a 20% tax on labor income or a 20% tax on consumption goods. State one condition under which the revenue will be equal.