

Econ 73-250A-F  
Spring 2001  
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### Practice Exercises for Exam #2

*As indicated on the course syllabus, this practice exam will be discussed during your recitation section on Friday, April 6. In the second midterm exam of Monday, April 9 you should expect exercises comparable in their difficulty to the ones in this practice exam. You won't be allowed to use any books or notes during the exam.*

**Exercise #1.** A firm produces output using the technology

$$y = \frac{1}{1,000}KL^{\frac{1}{2}},$$

where capital,  $K$ , is measured in machine-hours, labor,  $L$ , is measured in person-hours, and  $y$  denotes the yearly output. The hourly wage rate  $w_l = 10$ , and the hourly rental rate of capital is  $w_k = 20$ .

- (a) Show that this technology displays increasing returns to scale.
- (b) Compute the marginal products of labor and capital.
- (c) Suppose that at the end of 1999 the firm has signed a contract to rent  $K = 1,000$  machine hours over the course of the year 2000. Derive the firm's short run cost function in the year 2000.
- (d) What is the firm's short run marginal cost function? What is the firm's short run average cost function? At which point do these two curves intersect?
- (e) On a diagram plot the firm's short run average and marginal cost curves.

**Exercise #2.** The aggregate labor supply in the state of Bahnanas is

$$L_s = 2,000w,$$

where  $w$  is the hourly wage, measured in Bahnanas \$ and  $L_s$  denotes the number of person- hours supplied by the workers of Bahnanas in a year. The aggregate labor demand in the state of Bahnanas is

$$L_d = 12,000 - 2,000w,$$

where  $L_d$  denotes the number of person-hours demanded by the firms of Bahnanas in a given year.

- (a) Compute the equilibrium hourly wage and the amount of hours worked in a given year.
- (b) The government of Bahnanas introduces a minimum wage law requiring firms to pay an hourly wage not lower than \$4. Compute the equilibrium number of hours worked by the workers of Bahnanas.

(c) On a diagram that has the wage rate on the y-axis and the number of hours on the x-axis, plot the labor demand and supply functions and the equilibrium prices and quantities that you found in points (a) and (b).

(d) Compute the deadweight loss induced by this policy, and show it on the diagram of point (c).

**Exercise #3.** Short questions.

(a) Compute the price and income elasticities of the following demand function

$$x_d(p,m) = \frac{1}{2} \frac{m}{p}.$$

(b) A firm produces output, denoted by  $y$ , using the following production function

$$y = 10\sqrt{L},$$

where  $L$  represents the labor input, measured in person-hours. The unit price of output is \$10. Let  $w$  denote the hourly wage rate. Compute and plot on a diagram the inverse labor demand curve for the firm.

(c) Explain how it can be possible that as tax rates decrease, government tax revenues increase (i.e. the Laffer curve).