

Name: _____

AP Microeconomics Unit V: The Factor (Resource) Market Problem Set #5

1. (___/15) Define the term and explain a situation that demonstrates the 'real world' application of each of the following. Make sure your example clearly demonstrates your understanding of each concept.
 - a. Derived Demand (___/5)
 - b. Marginal Revenue Product (MRP) and Marginal Resource Cost (MRC) (___/5)
 - c. Monopsony (___/5)

2. (___/17) Use the chart regarding a perfectly competitive Yo-Yo factory to complete the following:
 - a. Fully explain why the number of yo-yos produced increases at a decreasing rate as more workers are hired. Identify and explain the three stages of returns. (___/5)
 - b. Explain how a firm decides how many workers to hire. If the wage was constant at \$25 per day, how many workers should be hired? Explain how you got your answer. (___/5)
 - c. Assume there is an increase in demand of yo-yos and they are now \$3 each. Explain how the level of employment be affected. How many workers should be hired? Why did it change? (___/5)
 - d. Complete the chart below. (___/2)

Number of Workers	Output (Quantity)	Marginal Product	Price of Yo-Yos	Total Revenue	Marginal Revenue Product
0	0	-----	\$2		-----
1	20				
2	50				
3	70				
4	85				
5	95				
6	100				
7	103				
8	104				
9	100				

3. (___/12) Complete the attached 2 page worksheet entitled, "How Wages are Determined in Competitive Labor Markets." Make sure to use complete sentences AND fully explain your answers.

4. (___/21) Complete the attached practice FRQs.
 - a. FRQ #1 (___/8)
 - b. FRQ#2 (___/13)

1. P & L is a profit-maximizing shirt-manufacturing firm. The firm can sell all the shirts it can produce to retailers at a price of \$20 each. P & L can hire all of the workers it wants at a market wage of \$120 per day per worker. The table below shows the firm's short-run production function.

Number of Workers	Number of Shirts per Day
0	0
1	10
2	25
3	45
4	60
5	72
6	80
7	85
8	82

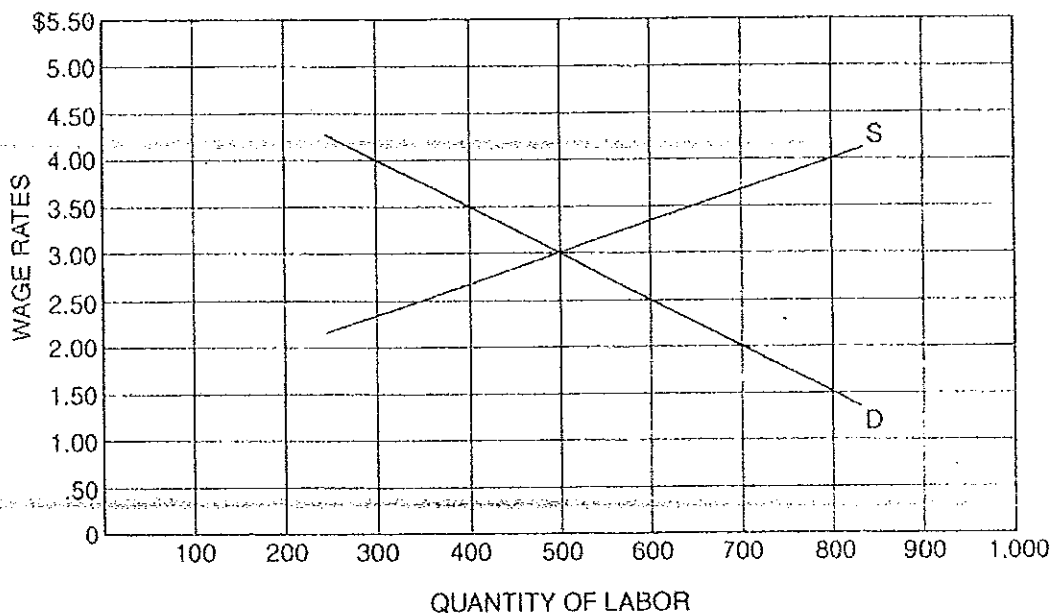
- (a) In what kind of market structure does this firm sell its output? How can you tell?
- (b) In what kind of market structure does this firm hire its workers? How can you tell?
- (c) Calculate the marginal revenue product of the third worker. Show your work.
- (d) How many workers should the firm hire to maximize profit? Explain.
2. Petsall Corporation is a profit-maximizing monopolist. It sells a patented rabies vaccine for pets and earns economic profits.
- (a) Draw a correctly labeled graph that shows each of the following for Petsall.
- Output and price of the vaccine
 - Area of economic profits
- (b) Assume that Petsall hires its production workers in a perfectly competitive labor market at the wage rate of \$20 per hour.
- State the marginal conditions for hiring the profit-maximizing amount of labor.
 - Draw a correctly labeled graph that shows the labor supply and demand curves for Petsall and indicate the profit-maximizing quantity of labor.
- (c) Suppose that the market wage rate now falls to \$15 per hour. Show on your diagram in (b) (ii) how each of the following would be affected.
- The supply of labor to Petsall
 - The amount of labor Petsall would hire
- (d) Given the lower wage rate in (c), indicate how each of the following would change.
- Total fixed cost
 - Marginal cost
 - Price of the product



How Wages Are Determined in Competitive Labor Markets



Figure 48.1
Wages and Labor



Use Figure 48.1, which shows the supply and demand curves for a perfectly competitive labor market in a perfectly competitive product market, to answer these questions:

1. What two factors affect the demand for labor?
2. How does marginal revenue product affect the demand for labor?
3. Why is the demand curve for labor downward sloping?

Adapted from Robert W. Pulsinelli and Roger LeRoy Miller, *Student Learning Guide to Accompany Economics Text* (New York: HarperCollins College Publishers, 1994).

4. What determines the market supply of labor? _____

5. Why is the market supply curve for labor upward sloping? _____

6. What is the equilibrium wage in this labor market? _____

7. How many workers will be hired in this labor market? _____

8. If a minimum-wage law raises the minimum wage to \$4.00 an hour, what quantity of labor will be supplied? _____

9. At a minimum wage of \$4.00 an hour, what quantity of labor will be demanded? _____

10. How many workers would be laid off or would lose their jobs because of this minimum wage?

11. How many workers entered the labor force seeking a job because of this minimum wage?

12. If the demand for labor were more inelastic, would more or fewer workers lose their jobs because of this minimum wage? _____

13. Would skilled or unskilled workers be more likely to lose their jobs because of a minimum-wage law? _____

14. Who benefits from the minimum wage?

15. Who is hurt by the minimum wage?

16. Do you favor a higher minimum wage? Why or why not?

Factor Market Pricing

Suppose that the Acme Belt Company (ABC) is a price taker in both the input and output markets—that is, it sells belts in a perfectly competitive market and purchases labor in a perfectly competitive market.

Part A

- Fill in the blank spaces in Figure 47.1. Note that marginal data are placed between levels of employment.



Figure 47.1

Labor Demand for the Perfectly Competitive Firm

Employment Number of Workers (L)	Total Output Per Day (Q)	Marginal Physical Product (MPP) ($\Delta Q / \Delta L$)	Marginal Revenue Product (MPP \times P)	
			$P_B = \$2.00$	$P_B = \$2.50$
0	0		—	—
1	10	10	\$20.00	
2	30	20	40.00	
3	70	40		100.00
4	105		70.00	
5	135	30	60.00	
6	160	25		62.50
7	180		40.00	50.00
8	195	15		
9	205	10	20.00	
10	205			0
11	195	-10		

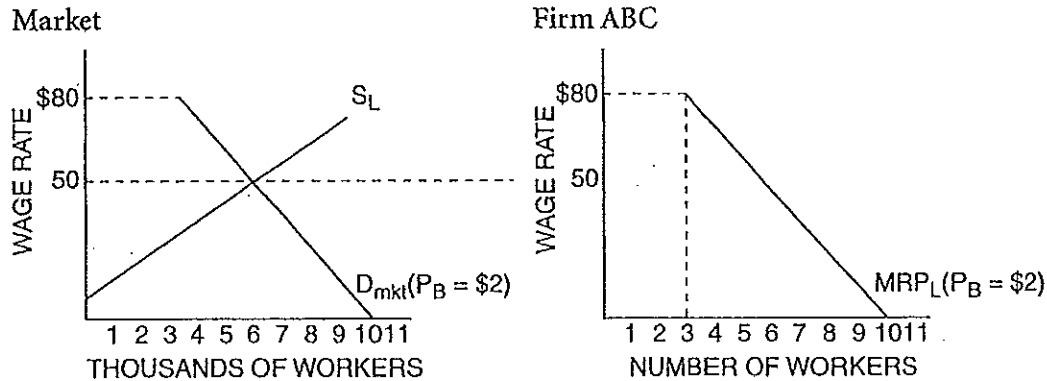
An individual firm's factor demand curve is restricted to a range of the MRP_L curve that is downward sloping, beginning at $L = 3$ for ABC.

- If the marginal resource cost, or wage, faced by ABC is \$20 and the price of belts is \$2 per belt, then the quantity of labor demanded by ABC is _____.
- If the marginal resource cost, or wage, faced by ABC is \$20 and the price of belts is \$2.50 per belt, then the quantity of labor demanded by ABC is _____.

Figure 47.3 shows the market labor supply curve as well as the firm and market demand curves when $P_B = \$2$. The supply curve shows that, *ceteris paribus*, as the wage increases, more workers are willing to supply their labor to this market, and existing workers in this market are willing to supply more labor.



Figure 47.3
Market and Firm Demand for Labor



- On the graphs in Figure 47.3 and the table in Figure 47.2, the equilibrium wage in the market is _____. The equilibrium quantity of labor in this market is _____ workers.
- Given that this is a competitive labor market, ABC faces a marginal resource cost, or wage, of _____.
- Because ABC can purchase as much or as little labor as it wants without affecting the market, it is said to face a perfectly elastic labor supply curve. Draw the labor supply faced by the firm in the *Firm ABC* graph above.
- Using a different color pen or pencil, graph ABC's and the market's labor demand curves in Figure 47.3, given that the price of a belt has increased to \$2.50.
- Designate the new market equilibrium based on Figure 47.2. The equilibrium wage in the market is now _____. The equilibrium quantity of labor in this market is now _____ workers.
- What has happened to the labor supply curve faced by the firm?

Part B

Figure 51.1 gives you information about a firm operating in a competitive product market. Consider all factors of production fixed, with the exception of labor. The other factors of production cost the firm \$50 a day, which may be thought of as a fixed cost. Assume the firm is a profit maximizer.



Figure 51.1
Firm Operating in a Competitive Product Market

Labor Input (workers per day)	Total Physical Product (units per day)	Marginal Physical Product (units per day)	Marginal Revenue Product (\$ per worker)
0	0		
1	22		
2	40		
3	56		
4	70		
5	82		
6	92		
7	100		
8	106		

Fill in the answer blanks or underline the correct words in parentheses.

8. Assume the firm sells its output at \$3 per unit. Complete the last two columns in the table.
 - (A) If the equilibrium market wage is \$36 per day, the firm will hire _____ workers per day and produce _____ units of output.
 - (B) Given your answer to the preceding question, the firm will have total revenue of _____ per day and total cost of _____ per day.
 - (C) The above will result in a (*profit / loss*) of _____ per day.

9. Suppose you work for a firm that sells its output in a monopoly market. Answer the following questions.
 - (A) If you hire an additional worker, output goes up by 50 units to 125 units per day. If you want to sell the additional 50 units, you must lower your price from \$3 per unit to \$2 per unit. What is the wage you would be willing to pay the additional worker? _____

