

Economics 460: Labor Economics
Department of Economics, Finance and Legal Studies
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Problem Set #2

1. Explain how marginal revenue product is derived. Why is the MRP curve also the firm's short-run demand curve for labor? Explain why and how the demand curve for labor differs between firms operating in a competitive industry and an imperfectly competitive industry (i.e., monopoly).
2. Explain the effect of the following on a firm's short-run demand for labor:
 - (a) an increase in the price of a substitute for labor (i.e. capital)
 - (b) a decrease in demand for the firm's final good
3. Explain graphically how isoquant-isocost analysis can be used to derive the long run demand curve for labor. Distinguish between substitution and output effects.
4. Referring to output and substitution effects, explain why an increase in the wage rate for autoworkers (perhaps due to a new union agreement, for example) will generate more of a negative employment response in the long run than in the short run. Assume there is no productivity increase and no change in the price of capital.
5. Suppose the firm is hiring labor and capital and that the ratio of marginal products of the two inputs equals the ratio of the input prices. Does this imply that the firm is maximizing profits? Why or why not?
6. Suppose there are two inputs in the production function: labor and capital, and these two inputs are perfect substitutes. The existing technology permits one machine to do the work of three persons. The firm wants to produce 100 units of output. Suppose the price of capital is \$750 per machine per week. What combination of inputs will the firm use if the weekly salary for each worker is \$300? What combination of inputs will the firm use if the weekly salary of each worker is \$225? What is the elasticity of labor demand as the wage falls from \$300 to \$225?
7. Suppose the hourly wage is \$10 and the price of each unit of capital is \$25. The price of output is constant at \$50 per unit. The production function is

$$q = K^{1/2}L^{1/2}$$

- (a) Show that the marginal product of labor is $MP_L = 1/2(K/L)^{1/2}$.
- (b) If the current capital stock is fixed at 1,600 units, how much labor should the firm employ in the short run?
- (c) How much profit will the firm earn?