VIDEO: FACTOR MARKETS

Part A
Creating the Firm's Demand for Labor

Table
Productivity and Revenue Data for Yo-Yo workers

L (workers per day)	Q (yo-yos per day)	MPP	P	TR	MRP
0	0	-	5	0	-
1	20	20	5	100	100
2	50	+30	5	250	+150
3	70	20	$5	350	100
4	85	15	5	$425	75
5	95	+10	5	475	50
6	100	5	5	500	25

1. Complete the Table above. Assume the market price of a yo-yo is $5.

2. Why does the number of extra yo-yos produces by an additional worker decrease as more workers are added? Is it because the additional works are less motivated and less talented than previous workers?
 MPP gets smaller due to the principle of diminishing marginal productivity, which says that as a firm adds more workers to a fixed amount of equipment, eventually the MPP diminishes. This is caused by the limited amount of capital and not because some workers are lazy or untrained. Think FLUFFERNUTTERS!
3. Plot the MRP values in the graph below. Connect those values and label the curve as "MRP." Plot each MRP value on the higher of the two L values, not at the midpoint. For example, plot the MRP value of $150 at L= 2 rather than at L= 1.5.

The Acme Firm's Demand for Labor and Supply of Labor
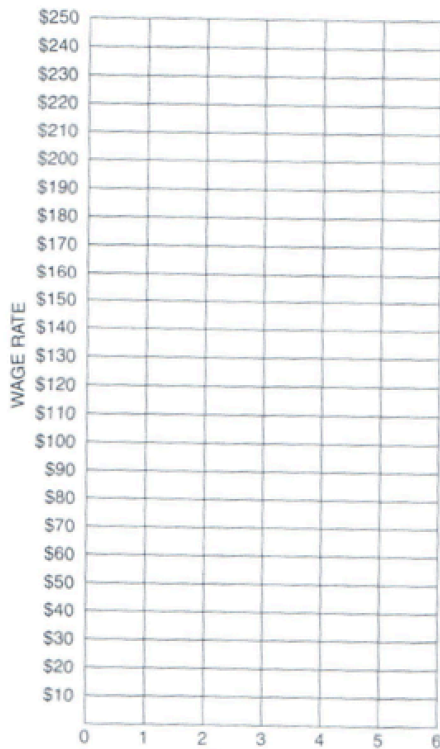
4. If the market is $100 per worker per day, your firm can hire all the workers it wants at that wage. This means the supply of labor to your firm can be shown as a horizontal line at the wage of $100. Draw a horizontal line in the figure above at 100.00 and label the line as "S_1= MRC_1." The MRC to the firm of each extra worker is equal to the wage of $100.

5. At a wage of $100, how many workers should your firm hire? Why?
The firm will hire 3 workers at a wage of $100. The first worker has MRP=$100, the second has MRP=$150, and the third has MRP=$100. Because the fourth worker has MRP of only $75, that worker will not be hired at a wage of $100.

6. Now assume the market wage drops to $75. Draw a new horizontal line at that wage and label it as "S_2= MRC_2." How many workers will be hired at the wage of $75?
The firm will hire four workers at a wage of $75

7. Finally, assume the market wage is $50. Draw another horizontal line at that wage and label it as "S_3= MRC_3." How many units of labor will be hired at the wage of $50?
The firm will hire five workers at a wage of $50.

Part B
The only game in town
Now. Let's suppose that Acme is a monopolist and controls the yo-yo market. Because it still hires its workers in a perfectly competitive labor market, we will continue to treat its marginal revenue product (MRP) curve as its demand for labor (L). It can hire all the workers it wants at the market wage rate.

The difference is that now the firm must lower its price to sell more yo-yos. It will make the MRP decrease faster than it did when the firms was perfectly competitive. Now there are two reasons why MRP decreases as more workers are hired: diminishing marginal productivity and diminishing marginal revenue.
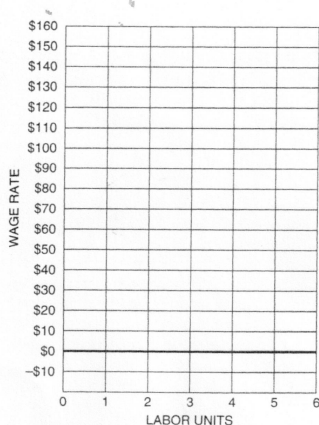
1. Complete the table below.

Student Alert: You cannot find the MRP of a worker by multiplying the marginal physical product (MPP) by the price (P). That worked in the activity above because the firm sold its output (Q) at the market price. But now the firm is a monopolist and must lower price to sell its output. MRP is found here as the change in total revenue (TR) when the firm adds an extra worker.

L (workers per day)	Q (yo-yos per day)	MPP	P	TR	MRP
0	0	-	$8.00	$0	
1	20	20	$7.25	145.00	145.00
2	50	+30	$6.00	300.00	+$155.00
3	70	20	$5.25	367.50	67.50
4	85	15	$4.70	$399.50	32.00
5	95	+10	$4.30	408.50	+$9.00
6	100	5	$4.00	400.00	-8.50

2. Plot the firm's MRP data in the figure below. Connect the MRP values and label the curve as "D= MRP." Plot the MRP values at the new labor amount rather than at the midpoint.

The Acme Firm's Demand for Labor and Supply of Labor

3. Draw the horizontal labor supply curves in the figure above at wages of $120, $60, and $30. Label them as "S₁= MRC₁," "S₂= MRC₂," and "S₃= MRC₃."

4. Complete the table below, which shows how many workers the firm will hire at each of these wages.

Wage	Number of workers hired
$120	2
$60	3
$30	4

THE OPTIMAL COMBINATION OF RESOURCES

Student Alert: This is a new topic to AP Micro. Students last year reported that there were questions both on the CLEP exam and AP exam so see if you can familiarize yourself with it well enough to get a couple multiple choice questions right.

Let's now consider a long-run example where the firm can change its capital as well as its labor. What combination of labor (L) and capital (K) should the firm employ?

Part A: The Least- cost Combination of Resources
What should a firm do if it wants to produce the most output possible from a given resource budget? What should it do if it wants to produce a given level of output at the lowest total cost? The approach to both of these problems is similar. They should allocate its resource budget between units of physical product is MPP and marginal resource cost is MRC:

$$\frac{MPP_L}{MRC_L} = \frac{MPP_K}{MRC_K}$$

If the resource markets are perfectly competitive, the price the firm pays for an extra unit of a resource is equal to its MRC. In that the condition can be written as

$$\frac{MPP_L}{P_L} = \frac{MPP_K}{P_K}$$

Another way of stating this condition for economic efficiency is that the firm should get the same extra output from the last dollar spent on each type of resource.

Assume a firm has allocated it given resource budget between labor and capital and finds the marginal physical product for the resources to be 200 units from labor and 400 units from capital. That means the last unit of labor increased total output by 200 units while the last unit of capital increased output by 400 units. At first glance, you might think the firm should move some money away from labor and over to capital. But that would totally ignore the prices of the two resources. Assume the prices of labor and capital in competitive resource markets are and $10 and $40, respectively.

1. Calculate the "MPP per $1" for each resource.

Labor: $\underline{200 \text{ units}}$ = 20 units per $1
        $10

Capital: $\underline{400 \text{ units}}$ = 10 units per $1.
          $40

2. Based on your work in Question 1, is the firm getting the most output possible from its given resource budget? If so, explain why. If not, how should it reallocate its budget between labor and capital?

No, the firm can do better. It should spend more of its budget on labor and less on capital. Labor is giving more output per $1 on the margin than is capital.

3. Suppose the MPP values are as given in Question 1, but that the prices of labor and capital are $10 and $20, respectively. Is this firm now getting the most output possible from its resource budget? Explain.

Labor: $\underline{200 \text{ units}}$ =20 units per $1
        $10

Capital: $\underline{400 \text{ units}}$ =20 units per $1
          $20

The firm is getting the most output possible from its resource budget. If it moved a dollar from one resource to the other, there would be no net change in output.

4. A different has allocated its resource budget between labor and capital and is producing a given output level at the lowest possible total cost. The MPP of labor is 25 units, and the MPP of capital is 20 units. If the price of a unit of labor is $100, what is the price of a unit of capital?

Since we know the firm is using the least-cost combination of resources, we can solve for the price of capital:

$\underline{25 \text{ units}}$ = $\underline{20 \text{ units}}$
$100   Pk

(25 units) (Pk)= $2,000

Pk= $80

Part B: The profit-maximizing combination of resources
This is similar to above with a couple of differences.
Here is the profit-maximizing condition for a combination of two resources:

$$\frac{MRP_L}{MRC_L} = \frac{MRP_K}{MRC_K} = 1$$

If the resource markets are perfectly competitive, the condition can be written as

$$\frac{MRP_L}{P_L} = \frac{MRP_K}{P_K} = 1$$

While this condition looks similar to the one Part A, there are two significant differences.
a. The firm is comparing MRP, not MPP, to MRC
b. The two ratios must both be equal to 1.

5. Suppose the Ebbets company produces 1,000 units of output with a combination of labor and capital such that the MRP of labor is $30 and the MRP of capital is $40. If this firm is maximizing its total profit at this output, what are the prices of units of labor and capital?

$\frac{\$30}{PL} = \frac{\$40}{Pk} = 1.$

The price of labor is $30 and the price of capital is $40.

6. The Shibe company produces 800 units of output per period. The MRP of labor is $60, and the MRP of capital is $40. The market prices of units of labor and capital are $12 and $8, respectively. Is this firm maximizing its total profit? Explain.

Labor: $\frac{\$60}{\$12} = \frac{\$5}{\$1}$

Capital $\frac{\$40}{\$8} = \frac{\$5}{\$1}$

No, it is not maximizing its total profits. Since the MRP from each resource exceeds the price (MRC) of that resource, the firm should hire more of each resource and expand its output. Don't be fooled by the fact that in this example two ratios are equal. The point is that both ratios are greater than 1, which means the firm should employ more labor and more capital.

Part A
Monosponistic Labor Market

Assume the Ross Textile Company is a monopsony in a small town. Because it faces the upward sloping market supply of labor, Ross must raise its wage if it wants to increase the quantity supplied of workers. The company pays the same wage to all its employees, so if it increases the wage to attract another worker, the marginal resource cost of that worker is greater than the wage paid to the worker: MRC> Wage.
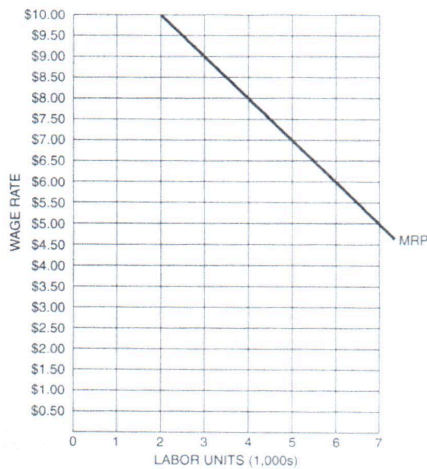
1. Complete the table below.
Labor Supply Schedule

Workers	Wage	Total labor cost	Marginal resource cost
1	$5.00	$5.00	5.00
2	$5.50	$11.00	6.00
3	$6.00	18.00	7.00
4	$6.50	26.00	8.00
5	$7.00	35.00	$9.00
6	$7.50	$45.00	10.00

2. Plot the Ross Company's labor supply (S) curve and MRC curve in the figure below. The firm's marginal revenue product (MRP) curve is already in the graph.

A Monopsonistic Labor Market

3. Why is the MRC curve above the S curve?
 Because the firm pays all workers the same wage, when it increases its wage to attract another worker then the true cost to the firm of that worker is greater than the wage paid to that worker. The worker's MRC is his or her wage plus the increase in wages for all other workers

4. What is more important to Ross as it considers hiring another worker- the wage paid to the worker or the worker's MRC? Why?
The MRC is more important. The firm hires the number of workers where MRP=MRC, not where MRP=wage, because it is a monopsonist and not a perfectly competitive employer. The extra cost of an additional worker is the worker's MRC, not the worker's wage.

5. How many workers will Ross hire? What wage will it pay to each of these workers?
The firm will hire 4,000 workers because that is where MRP=MRC. It goes to the labor supply curve to find the wage needed to attract 4,000 workers: $6.50

6. Is the MRP curve the firm's D curve for labor?
 No, Because the firm is a monopsonist, the wage is not equal to the MRC. The firm finds its profit-maximizing amount of labor where MRP=MRC, but it does not get the wage from the intersection of the MRP and MRC curves; it must go to the labor supply curve for the wage. A monopsonist in the resource market does not have a labor demand curve, similar to the way a monopsonist in the product market does not have a supply curve.

7. What would be the equilibrium wage and employment if this were a perfectly competitive market? How do these values compare with those of the monopsonist?
 In a perfectly competitive market, equilibrium would be where the MRP curve intersects the S curve. The wage would be $7.00 and the employment would be 5,000 workers. The wage and employment would be higher than in the case of monopsony.

Part C
Monopsony and a Minimum Wage
The graph below illustrates the labor market in which there is only one employer. This monosponistic sells its good in a perfectly competitive product market.

A Monopsonistic Labor Market
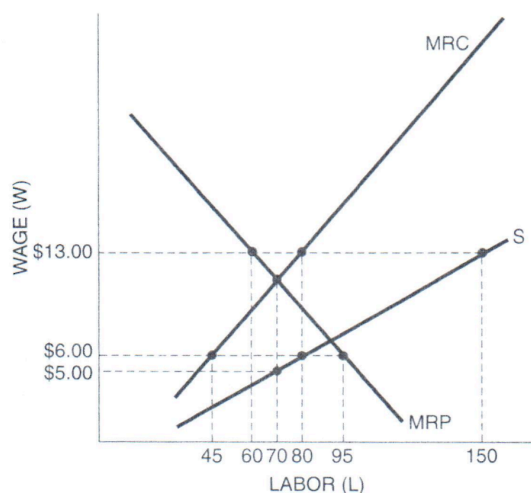
1. What is the profit-maximizing amount of labor for this monosponistic firm? Why?

The firm will hire 70 units of labor because that is where MRP=MRC

2. What wage will it pay each unit of labor? Why?

It will pay a wage of $5.00, as shown in the S curve at 75 units of labor

3. If the government sets a minimum wage of $13.00, how many units of labor would be hired? How many units of labor will be unemployed with this minimum wage? Explain.

At a minimum wage of $13.00, 60 units of labor will be hired where the MRP curve intersects the revised MRC curve. The MRC of labor will be shown as a horizontal line at $13.00 out to the labor supply curve at 150 units because the firm can attract up to 150 labor units at a wage of $13.00. To attract more than 150 labor unit, the firm will have to offer a wage higher than $13.00. The cost of an extra unit of labor jumps up to the original MRC curve beyond 150 labor units. At the high minimum wage of $13.00, 150 labor units are supplied but only 60 units are hired. The result is unemployment of 90 labor units.

UNIT FOUR REVIEW

Student Alert: (ie these concepts should be pretty simple, if not practice some more problems from your study guide book!)

Unit IV Big Ideas

Firms are sellers in product markets and buyers in factor (resource) markets.

The demand for any resource is derived from the demand for the products that the resource can produce. Thus, resource demand depends on the price of the good or service that the resource produces and on the resource's productivity in producing the good or service.

The demand curve for a resource in the short run is downward sloping because the marginal physical product (MPP) of additional inputs of a resource will decrease as a result of the law of diminishing marginal returns. In some textbooks, marginal physical product is called marginal product.

The resource demand curve for a firm selling in an imperfectly competitive market will be steeper than the resource demand curve for a firm selling in a perfectly competitive market. The steeper slope results from both a decrease in the marginal physical product and a decrease in the product price required to permit the firm to sell a larger output.

A firm will continue to hire factors of production as long as its marginal revenue product (MRP) exceeds its marginal resource cost (MRC). A firm will not hire resources once MRC exceeds MRP.

A firm maximizes profits where a factor's marginal revenue product equals the factor's marginal resource cost. A firm maximizes profit where MRP = MRC.

In a perfectly competitive labor market, a firm will hire workers until the last worker's wage (MRC) equals the marginal revenue product of that last worker hired.

When a combination of resources is employed in producing a good or service, the profit-maximizing rule is

$$\frac{MRP_a}{MRC_a} = \frac{MRP_b}{MRC_b} = \frac{MRP_n}{MRC_n} = 1$$

When a firm produces the profit maximizing level of output, it must utilize a least- cost combination of resources. The rule for a least-cost combination of resources is short run is downward sloping because the marginal physical product (MPP) of additional inputs of a resource will decrease as a result of the law of diminishing marginal returns. In some textbooks, marginal physical product is called marginal product.

$$\frac{MPP_a}{MRC_a} = \frac{MPP_b}{MRC_b} = \frac{MPP_n}{MRC_n}$$

For a firm facing a perfectly competitive resource market, resource supply is perfectly elastic and equal to marginal resource cost at a market-determined price (wage) for the resource. Under monopsony or imperfect conditions of employment, both resource supply and marginal resource cost are positively sloped curves with the marginal resource cost being a value greater than the price (wage) for all units beyond the first unit of the resource employed.

Given a downward-sloping marginal revenue product curve and the differences existing between supply and marginal resource cost in perfect competition and monopsony, a monopsonistic employer will pay a lower price (wage) and hire fewer units of a resource than a perfect competitor.

Economic rent is any payment to the supplier of a resource that is greater than the mini- mum amount required to employ the desired quantity of the resource to be supplied.

The equilibrium real interest rate influences the level of investment and helps allocate financial and physical capital to specific firms and industries.

Profits are the return to entrepreneurs for assuming risk and for organizing and directing economic resources.

Profits allocate resources according to the demands of consumers.