Discussion 10

Important Topics

- Input Markets
- General equilibrium and Pareto efficiency

Input Markets

Exercise 1 Willy Wonka's Chocolate factory produces chocolate bars by using Oompa Loompas (labor) and boats that float down the chocolate river (capital). Assume that Willy Wonka is a price taker in the markets for chocolate bars, Oompa Loompas and boats.

a.) Suppose the price of a chocolate bar is \$5 and at the current level of labor and capital $MP_L = 10$, $MP_K = 100$, the price of labor is \$40 and the rental price of a boat is \$600. Assuming the chocolate factory exhibits diminishing marginal returns to both labor and capital, what should Willy Wonka do to improve his profits?

b.) Charlie eventually takes over the chocolate factory and ensures that it always maximizes profits. Years later the price of a chocolate bar is \$6 and the wage of an Oompa Loompa is \$72. Calculate the MP_L under Charlie's management.

Exercise 2 Consider a representative firm producing a certain good using labor as an input. The firm is a price taker both in labor market and in output market.

a.) Complete the following table for the firm. What is the market equilibrium price for the good?

Number of Workers	Output (q)	MP_L	MRP_L
0	0	-	-
1			380
2			340
3			300
4	64		
5	75		220
6		9	
7		7	
8	96	5	

b.) Suppose the current market wage is \$200. How many laborers will the firm hire?

c.) Assume labor is the only input and wage is still \$200. This firm's output level is 64, what is the average cost for this firm?

d.) Suppose the market wage falls by \$65. How many workers will the firm hire now?

Exercise 3 Consider the retail gasoline market, which is perfectly competitive. Market demand and supply for gasoline are represented by the following:

$$\text{Supply: } P = 0.2Q$$
$$\text{Demand: } P = 400 - 0.2Q$$

P is the price of gasoline and Q is gallons of gasoline. There are 100 identical firms in the market. Each gas station hires workers in a perfectly competitive labor market. The supply and demand for labor are represented by:

$$\text{Supply: } W = 0.03L$$
$$\text{Demand: } W = 50 - 0.02L$$

W is the price of labor (wage) and L is the quantity of workers.

a.) How many workers will be hired by each firm in equilibrium?

b.) What is the market equilibrium wage?

c.) What is the market equilibrium price of gasoline?

d.) Calculate the marginal product of labor for each firm.

Exercise 4 Suppose Dr. Wells own a running machine company called "STAR". He hires technicians (called "Cisco", capital) and normal workers (called "Barry", labor) to produce treadmills. The marginal product of "Cisco" is $MP_K = 30 + 3L$ and marginal product of "Barry" is $MP_L = 20 - L$.

a.) In equilibrium, wage of "Cisco" is three times as much as wage of "Barry". How many "Barry" workers will be hired?

b.) When the number of "Barry" workers increases, what happens to MPK? Increase or decrease? What is the relationship between these two inputs?

c.) If the wage of "Cisco" increase, does Dr. Wells hire more "Barry" workers? Or fewer "Barry" workers? Why? [Hint: Consider both "Output effect" and "factor substitution effect"!]

Pareto Efficiency Questions

Exercise 5 Hurley and Leonard pool their money to buy a lottery ticket and manage to win one million dollars. Which of the following is a Pareto efficient division of the winnings, assuming Hurley and Leonard both want as much money as possible?

a.) Hurley and Leonard split the money fifty-fifty.

b.) Hurley gets all the money and Leonard gets nothing.

c.) Leonard gets $400,000, Hurley gets $300,000 and the other $300,000 is burned