



# Microeconomics

## Unit 5 Practice Sheet ([Video Help](#))

**Part 1: Hiring Workers-** Use the chart for a firm in a perfectly competitive labor market to answer the questions.

Quantity Workers	Total Product	Marginal Product
0	0	-
1	15	15
2	35	20
3	45	10
4	53	8
5	57	4
6	58	1
7	56	-2

1. Assume that the market price of the product is \$3 and the wage is \$15. How many workers should be hired to maximize profit?

**4 workers. Hire where the MRP = MRC.**

2. Assume that the fixed costs are \$40. Calculate the profit or loss.

**\$59 = TR (53 x \$3) - TC (\$40 + \$60) = \$159 - \$100**

3. Assume that the price of the product increased to \$5. How many workers should be hired to maximize profit?

**5 workers. Hire where the MRP = MRC**

4. Assume the fixed costs stays \$40. Calculate the profit or loss.

**\$170 = TR (57x \$5) - TC (\$40 + \$75) = \$285 - \$115**

5. Assume that the government established a minimum wage of \$25, how many workers would the firm hire to maximize profit?

**4 workers. Hire where the MRP = MRC**

6. If the fixed costs are \$40. Calculate the profit or loss with the \$25 minimum wage and \$5 price.

**\$125 = TR (53 x \$5) - TC (\$40 + \$100)= \$265 - \$140**

**Part 2 - Graph Practice-** The graph shows the MRP for a different firm hiring workers in a perfectly competitive labor market.

Wage



7. Assume that the wage is \$20. Draw a marginal resource cost (MRC) curve and identify how many workers should be hired to maximize profit?

**8 workers. Hire where the MRP = MRC**

8. Assume that the fixed cost is \$50. What is the total cost of hiring the profit maximizing quantity?

**\$210 = FC (\$50) + VC (Wage times quantity)**

9. Assume the firm produces in a perfectly competitive product market and the price of the product is \$2. How much additional output did the last worker produce? **10 units. The MRP of the last worker is \$20 and the price is \$2 so the MP is 10.**

10. Assume instead that the wage is \$30. How many workers should be hired to maximize profit?

**6 workers. Hire where the MRP = MRC**

11. Assume that the fixed cost stays \$50. What is the total cost of hiring the profit maximizing quantity?

**\$230 = FC (\$50) + VC (Wage times quantity)**



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**Part 3 - Least-Cost Rule-** The tables below show the total amount of deliveries that can be made in a day using delivery drivers and drones. Assume that delivery drivers cost \$50 and drones cost \$150. Fill out the chart and answer the questions.

Quantity of Drivers	Total Deliveries	Marginal Product
0	0	-
1	100	100
2	150	50
3	175	25
4	180	5

Quantity of Drones	Total Deliveries	Marginal Product
0	0	-
1	150	150
2	225	75
3	270	45
4	285	15

12. With a constraint of \$450, what combination of drivers and drones would minimize costs while maximizing the total number of deliveries? Explain. **3 drivers and 2 drones.** I used the cost minimizing rule  $MP(\text{drivers})/P(\text{drivers}) = MP(\text{drones})/P(\text{drones})$ . I calculated the marginal product per dollar for both drivers and drones and hired the ones that gave the most MP/\$.
13. How many total deliveries can be made each day with this combination? Show your work. **400 deliveries = 175 from drivers + 225 from drones.**

**Part 4 - FRQ Practice-** Complete the following question from the 2008B AP exam (Question 3).

3. GW Company produces and sells hats in a perfectly competitive market at a price of \$2 per hat. Assume that labor is the only variable input and the wage rate is \$15 per unit of labor per day. The table below shows GW's short-run production function for hats.

Number of workers per day	0	1	2	3	4	5	6
Output of hats per day	0	10	26	36	44	49	52

- After which worker do diminishing marginal returns begin?
- Calculate the marginal physical product of the fifth worker.
- Calculate the marginal revenue product of the third worker.
- How many workers will GW hire to maximize profit?
- If GW Company has fixed costs equal to \$20, what will be the company's short-run economic profits from hiring two workers?
- If the price of hats increases, what will happen to the number of workers hired in the short run? Explain.



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**7 points** (1 + 1 + 1 + 1 + 1 + 2)

(a) 1 point:

- One point is earned for stating the second worker.

(b) 1 point:

- One point is earned for stating the MP of the fifth worker is five units.

(c) 1 point:

- One point is earned for calculating the MRP of the third worker: \$20.

(d) 1 point:

- One point is earned for stating the GW will hire four workers.

(e) 1 point:

- One point is earned for calculating the profit: \$2.

(f) 2 points:

- One point is earned for stating that more workers will be hired.
- One point is earned for the explanation that the increase in the price of hats raises the marginal revenue product, hence the demand for labor.