

4. Nimbus, Inc., makes brooms and then sells them door-to-door. Here is the relationship between the number of workers and Nimbus's output during a given day:

Workers	Output	Marginal Product	Total Cost	Average Total Cost	Marginal Cost
0	0	—	—	—	—
1	20	—	—	—	—
2	50	—	—	—	—
3	90	—	—	—	—
4	120	—	—	—	—
5	140	—	—	—	—
6	150	—	—	—	—
7	155	—	—	—	—

- Fill in the column of marginal products. What pattern do you see? How might you explain it?
- A worker costs \$100 a day, and the firm has fixed costs of \$200. Use this information to fill in the column for total cost.
- Fill in the column for average total cost. (Recall that $ATC = TC/Q$.) What pattern do you see?
- Now fill in the column for marginal cost. (Recall that $MC = \Delta TC / \Delta Q$.) What pattern do you see?

5. You are the chief financial officer for a firm that sells gaming consoles. Your firm has the following average-total-cost schedule:

Quantity	Average Total Cost
600 consoles	\$300
601	301

Your current level of production is 600 consoles, all of which have been sold. Someone calls, desperate to buy one of your consoles. The caller offers you \$550 for it. Should you accept the offer? Why or why not?

4. Nimbus, Inc., makes brooms and then sells them door-to-door. Here is the relationship between the number of workers and Nimbus's output during a given day:

Workers	Output	Marginal Product	Total Cost	Average Total Cost	Marginal Cost
0	0		200	DNE	
		20			5
1	20		300	15	
		30			3.33
2	50		400	8	
		40			2.5
3	90		500	5.56	
		30			3.33
4	120		600	5	
		20			5
5	140		700	5	
		10			10
6	150		800	5.33	
		5			20
7	155		900	5.81	

a. Fill in the column of marginal products. What pattern do you see? How might you explain it?

Marginal product is increasing at first, then it starts to diminish (Law of marginal return). It might be the case that the very first units of labor put in the production has not fulfilled the full capacity of the fixed capital yet, so the marginal product is increasing at the first place. Once the capacity is fulfilled, the more labor putting in the production leads to the diminish marginal product. (Total product increases in a decreasing rate)

b. A worker costs \$100 a day, and the firm has fixed costs of \$200. Use this information to fill in the column for total cost.

Fill in the total cost column

c. Fill in the column for average total cost. (Recall that $ATC = TC/Q$.) What pattern do you see?

Average total cost (AC) is diminishing at the beginning and it starts increasing after it has reached at some level of quantity (For this example, after it has reached $Q = 140$)

d. Now fill in the column for marginal cost. (Recall that $MC = \Delta TC / \Delta Q$.) What pattern do you see?

Notice that MP and MC are correlated.

- When MP is increasing, MC is decreasing.
- When MP is diminishing, MC is increasing.

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Q	AC (\$)	TC (\$) = AC · Q	MC (\$)
600	300	180,000	
601	301	180,901	901

Should deny the offer because in order to produce one more unit, it costs \$901. So, the offer of \$550 is not worthwhile.