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HW#11 Due April 29, 2021

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		___	___	

   a. Fill in the column of marginal products. What pattern do you see? How might you explain it?
   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.
   c. Fill in the column for average total cost. (Recall that $ATC = TC/Q$.) What pattern do you see?
   d. 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?

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

A. Marginal Products = Δ in output.

At the beginning, the marginal products are increasing until it reached 30 (its maximum), then it starts to decreases as the result of diminishing.

B. Worker Cost = $100
Fixed Cost = $200
Total Cost = Fixed cost + (worker cost x # of worker)

C. Average Total Cost (ATC) = $\frac{\text{Total Cost (TC)}}{\text{Quantity (Q)}}$

- Average Total Cost is a U-shaped, as it decreased at first, then after reached some point, it starts to increased again. Average Total Cost is less than Marginal Cost when Marginal Cost increases and more than Marginal Cost as Marginal Cost decreases.

D. Marginal Cost (MC) = $\frac{\Delta \text{Total Cost (TC)}}{\Delta \text{ Quantity (Q)}}$

The Marginal Cost is a U-shaped as well. And MC is intersects ATC (Average Total Cost) at the Minimum point.

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Quantity	Average Total Cost
600 consoles	$300
601	301

- At the output of 600, the total cost is

  Total Cost = Average total cost × Quantity

  TC = 600 × 300

  = $180,000

- At the output of 601, total cost is

  TC = 601 × 301

  = $180,901

- $MC = \frac{d}{dQ} TC$

  $= \frac{\Delta TC}{\Delta Q}$

  $= \frac{901}{1} = 901$

- Thus, in this case you should not accept the offer of $550 because the marginal cost is $901 which is much higher than the offering price.