

EC215-Computer Homework
On the costs of production
Due: June 3, 2020

Directions: For each of the following problems you should use EXCEL to calculate the various measures of costs. There are supplemental instructions for each problem. For your final copy to turn in you should make sure that each problem is numbered and that headings are provided for each column of numbers. You should also provide headings for each problem and graph and other appropriate documentation. Round all numbers to two decimal points.

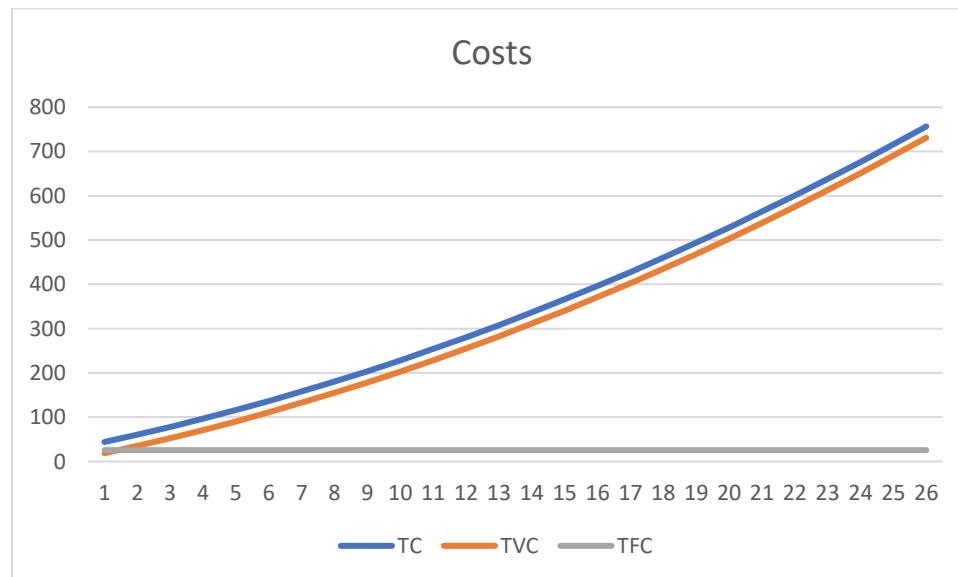
1. You are given the following total cost function for a firm:

$$TC = (25+F) + L \times Q + 0.5 \times (Q^2)$$

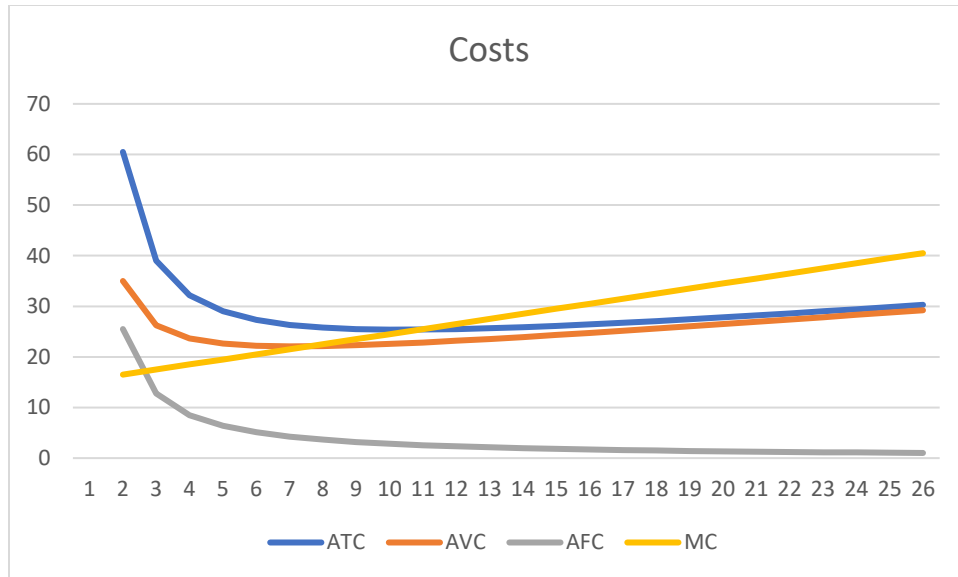
where F=the number of the letter of the alphabet corresponding to the initial of your first name, and L=number of the letter of the alphabet corresponding to the initial of your last name. For example, if your name were Bill Weber, F=2 and L=23, so

$$TC = 27 + 23 \times Q + 0.5 \times Q^2$$

- a. Calculate TC, TFC, and TVC for the levels of output between Q=0 and Q=30 (i.e., Q=0, Q=1, Q=2, Q=3,..., Q=29, Q=30). Make a graph of TC, TFC, and TVC as a function of Q. (Use an xy graph, connect the points, and make sure these three curves are all on the same graph.)

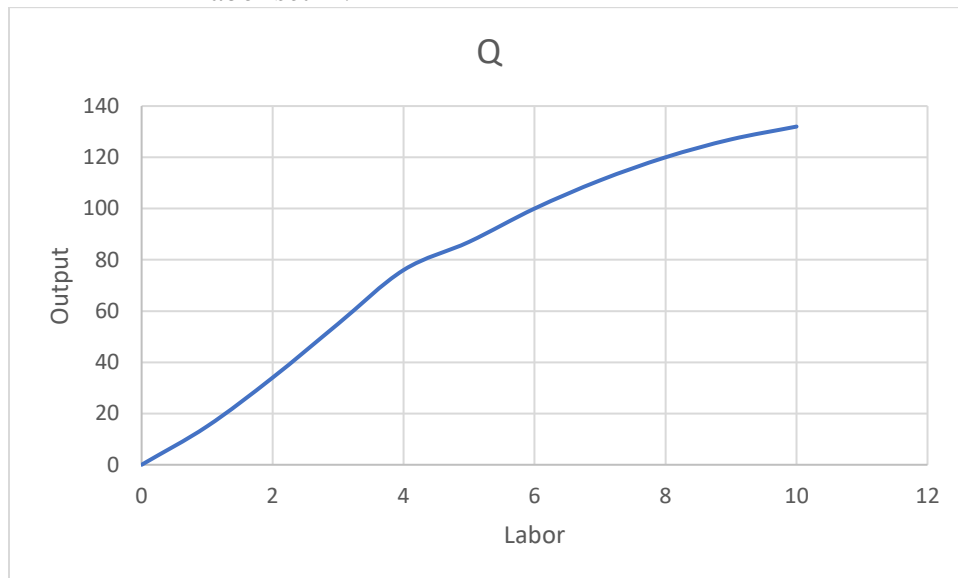


- b. Calculate ATC, AFC, AVC, and MC as a function of Q and produce a graph of the ATC, AFC, AVC, and MC curves as a function of Q . (Again, use xy graph, connect the points, and make sure these curves are all on the same graph. Also, since ATC, AFC, AVC, and MC are not defined at $Q=0$, start your graph using $Q=1$, not $Q=0$.)

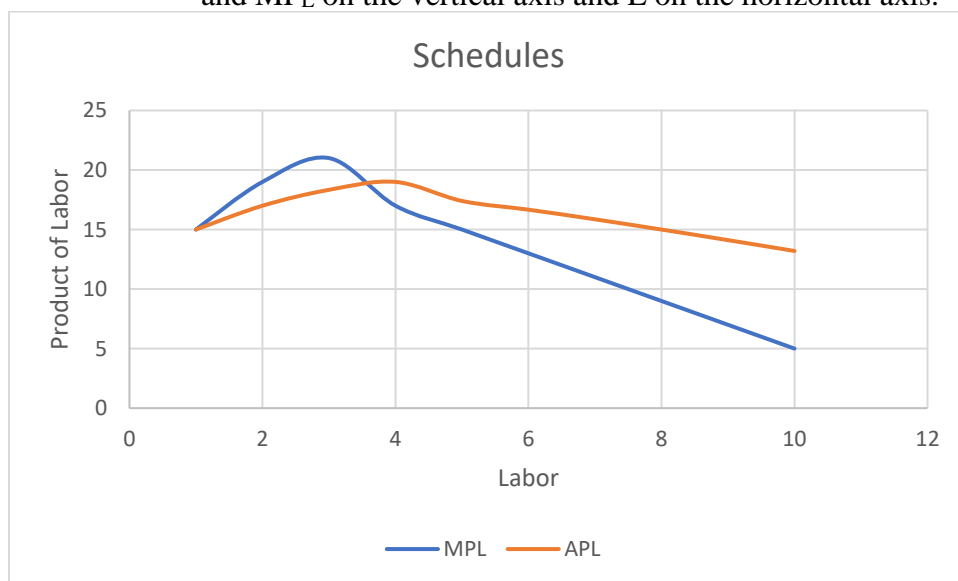


2. The marginal product of labor schedule for a firm is given below for alternative levels of labor. Calculate the total product schedule, Q , for each level of labor employed. Also calculate the average product schedule, AP_L .

- a. Produce a graph of the production function. ie. a graph of Q on the vertical axis and L on the horizontal axis. Identify on your graph where diminishing returns to labor set in.



- b. Produce a graph of the marginal product and average product schedules. Put AP_L and MP_L on the vertical axis and L on the horizontal axis.



- c. Calculate the MC schedule for the firm if the firm faces a price of labor (the wage) of $w = \$\text{First}$ and $w = \$(\text{First} + \text{Last})$, where First=# of the letter corresponding to your first name and Last=# of the letter corresponding to your last name. Produce a graph of the two MC schedules as a function of Q. (graph MC on the vertical axis and Q on the horizontal axis for each w. Use the xy graph. The two marginal cost curves should be on the same graph.) MP_L =marginal product of labor. (I am providing the columns for TVC because you will use it to calculate MC).

Labor	MP_L	Q=output	AP_L	TVC (w=First)	TVC (w=First+Last)	MC (w=First)	MC (w=First+Last)
0	xx	0	x			x	x
1	15	15					
2	19	38					
3	21	63					
4	17	68					
5	15	75					
6	13	78					
7	11	77					
8	9	72					
9	7	63					
10	5	50					

I couldn't figure out the MC because we don't know the total cost or fixed costs, and I couldn't find any other way of calculating that.

Labor	MP_L	Q	AP_L	TVC	TVC (w/Last)	MC	MC (w/Last)
0		0					
1	15	15	15	19	35		
2	19	34	17	19	35		
3	21	55	18.33333	19	35		
4	17	76	19	19	35		
5	15	87	17.4	19	35		
6	13	100	16.66667	19	35		
7	11	111	15.85714	19	35		
8	9	120	15	19	35		
9	7	127	14.11111	19	35		
10	5	132	13.2	19	35		

d. Explain what happens to marginal cost when the price of labor increases.
As labor increases, it increases the fixed cost. This, in turn, increases total cost and marginal cost.