Answers to Homework # 5

Try questions 8.1, 8.2, 8.3, 8.14, and 8.15 on pages 238 and 239 of the textbook.

Answer to 8.1

q	TFC	TVC	TC	MC	AFC	AVC	ATC
1	$100	$50	$150	$50	$100	$50	$150
2	100	80	180	30	50	40	90
3	100	120	220	40	33.3	40	73.3
4	100	170	270	50	25	42.5	67.5
5	100	250	350	80	20	50	70

Answer to 8.2

Let d = delta or change. Then recall that $MC = d(TVC)/d(Q_{output}) = [d(Q_{input})/d(TPP)] \times P_{input} = 1/MPP_{input} \times P_{input}$. Thus, if the MPP of the input is rising (falling) then MC is falling (rising). If the MPP of an input is falling from the start, then MC and AC will rise and MC is above AC. Alternatively, if the MPP of an input rises and then falls, the MC and AC are U shaped, and when AC and MC are falling (rising) MC is below (above) AC.

Answer to 8.3

Number of Trucks	Amount of Labor	Total Output	Average Product of Labor	Marginal Product of Labor
2	0	0	-----	-----
2	1	75	75	75
2	2	200	100	125
2	3	300	100	100
2	4	380	95	80
2	5	430	86	50
2	6	450	75	20

(a) APP of labor is shown in the 4th column of the table.

(b) MPP of labor is shown in the 5th column of the table.

The APP and MPP of labor rise and then fall. When the APP and MPP of labor are rising (falling), the MPP_L is above (below) the APP_L. These curves can be converted into AVC and

MC by recalling their relationship to the APP and MPP of labor. As stated in the answer to 7.2, $MC = 1/MPP_L \times P_L$. In addition, the $AVC = TVC/Q_{output} = [(Q_L)/TPP_L] \times P_L = 1/APP_L \times P_L$.

Answer to 8.14

There are more textile makers than automobile makers because average costs in the textile industry begin rising after fewer units of output than in the auto industry. This gives an advantage to smaller firms in the textile industry. Auto makers have huge investments in fixed costs such as plants, assembly lines, and robots which means that AFC fall more as output expands which pulls AC down over more units of output. Thus, the minimum efficient scale is much larger for the automobile industry than it is for the textile industry, so there is not room for many car companies. A larger number of textile companies can exist in the same market.

Answer to 8.15

CRTS indicates that output doubles when all of the firm's inputs are doubled. Recall that $AC = [P_{inputs} \times Q_{inputs}]/Q_{output}$, so AC is a horizontal line. If AC is neither rising nor falling then MC must equal AC. In addition, TC (i.e., $P_{inputs} \times Q_{inputs}$) will rise in direct proportion to greater input use, so TC is a straight line sloping upward.