

Homework #6

Note: Make sure to do these without a calculator.

- 1.) Let $TC = 100 + 150Q - 12Q^2 + 2Q^3$.
 - a.) Find the equations for MC and AVC.
 - b.) Calculate the Q' that minimizes MC (when slope of MC = 0) and the Q'' that minimizes AVC (when slope of AVC = 0 and when AVC = MC).
 - c.) Calculate MC and AVC at their minima. Draw MC and AVC with Q' and Q'' , and solving for MC and AVC at $Q = 0$.
 - d.) Under what price will a firm shut-down in the short-run?
 - e.) All firms maximize profits at the Q where $MR = MC$. And for a firm in a competitive market, $P = MR$. Assuming competition here, solve for equilibrium Q if $P = 150$. At that level of Q , calculate AFC, AVC, ATC, FC, VC, TC, TR, and profits/losses. Shut down or operate? Why?
 - f.) At $P = 180$, profit-maxing equilibrium output is 5. (You can take that on faith—or can you figure out how one would determine that?) Again, calculate TC, VC, FC, ATC, AVC, AFC, TR, and profits/losses.
 - g.) Draw two new-and-improved versions of your graph, illustrating profits/losses for $Q = 4$ and $Q = 5$.

- 2.) For the table you completed for question 3 on homework 5, what is the firm's most profitable output level in a competitive industry—and what is the resulting profit—if price is:
 - a.) \$35 per unit
 - b.) \$55 per unit
 - c.) \$75 per unit

- 3.) If the *variable* costs in the table for the preceding question are inflated by 50%, will the firm's profit-maximizing output level change? Illustrate your answer with a rough graph of 2c (revised).

- 4.) “You should never sell for less than it costs you to produce.” Briefly explain why this statement is correct or not—if “costs to produce” is interpreted as the following:
 - a.) ATC
 - b.) AVC
 - c.) MC