

Homework #8 (due Thursday)

Note: Make sure to do these without a calculator. (You won't be allowed to use one on the exam.)

- 1.) Let $TC = 3000 + 100Q - 12Q^2 + Q^3$.
 - a.) Identify the fixed and variable costs in the above equation.
 - b.) From the above equation, solve for AFC, AVC, ATC & MC-- in general and then, for $Q = 10$. (For MC, remember the following derivatives: $d(c)/dX = 0$, $d(cX)/dX = c$, $d(cX^2)/dX = 2cX$, and $d(cX^3)/dX = 3cX^2$.)
 - c.) Draw the MC, AVC and ATC curves in general (p. 207's Fig. 8.2b except for AFC). On the graph, note Q' where $AVC = MC$ and Q'' where MC is minimized. Calculate Q' and Q'' for the above equation.
 - Hint for Q' : what is happening between AVC and MC at Q' and/or what is the slope of AVC at Q' ? (Thus, there are two ways to make this calculation.)
 - Hint for Q'' : what is the slope of MC at Q'' ?

- 2.) If the marginal product of the variable input declines from the very start, what will the short-run marginal cost, average total cost, and average variable cost curves look like?

- 3.) Questions 8.1 and 8.3 from B&Z, noting that the latter asks for L/Q , *not* Q/L . (If you have the international version of the book, note that the question should refer to 7.1, not 8.1.)