

1. Consider $g = f(k) = 3 + 2k + 3k^2$, defined for $k \in [0, 100]$
 - a) what is the *independent variable*?
 - b) what is the *domain*?
 - c) what is the *dependent variable*?
 - d) what is the *range* (i.e., what are the *minimum and maximum values* of the *dependent variable*)?
 - e) Evaluate the function at $k=10$.
 - f) Graph the function using excel or a graphing calculator. Be sure to label the axes. Print it and turn in a paper copy.

2. Evaluate $\sum_{k=1}^4 2^k$

3. Write an equation that says “add the first five integers”, i.e., $1 + 2 + 3 + 4 + 5$, using “ Σ ” notation.

4. A business’s costs of production are summarized by the following:

$$C(Q) = 120 + 45Q - Q^2 + 0.4Q^3$$
 And the price customers will pay for each level it sells is summarized by the following market (inverse) demand curve:

$$P(Q) = 240 - 20Q.$$
 Write out the business’s PROFIT equation. Remember, Profit $\equiv P(Q) \cdot Q - C(Q)$.
 (Extra credit: plot this on a graph with Q on the horizontal axis and \$profit on the vertical axis.)

5. STORY: A government program with an annual budget of \$12.4 million is to be eliminated over the next five years by cutting the budget by 50% each year (2010 to 2013), then to zero in 2014.
 - a) provide a table that lists the year, the level of the budget each year, and the amount reduced compared to the previous year.
 - b) illustrate the trend in the budget by creating a fully-labeled, easy to read, black&white *time series* graph (if you use Excel, print your final product and turn in a paper copy.)

6. STUDY Chapter 2 in the Dowling text. When $Q_s = -5 + 3P$ and $Q_d = 10 - 2P$, find the *equilibrium price* and *quantity*.

7. A person has \$120 to spend on items “X” and “Y.” Item X costs $P_x = \$6$ each, and $P_y = \$4$ each. If he spends all his money, he can afford various combinations or quantities of each, Q_x and Q_y . Write out the consumer’s budget equation such that his expenditure just equals \$120. Graph the expenditure identity (or *budget line*) with the Y good on the vertical axis, good X on the horizontal axis.

8. If demand is $Q_d = 2,160 - 180P_d$ and supply is $Q_s = -2,400 + 300P_s$, find the *equilibrium price* and *quantity*.

9. Suppose consumers will buy 40 units of a product (per period) when the price is \$12.75 each; and 25 units when the price is \$18.75. Assume that the *demand function* is *linear*.
 - a) Find the (equation for) the *demand function*.
 - b) What is the slope-intercept equation for the graph of demand?
 - c) What price per unit are customers willing to pay for 37 units?

10. If *inverse demand* is $P_D = \frac{-7}{100}Q + 65$ and *inverse supply* is $P_S = \frac{8}{100}Q + 50$,
 - a. find the *equilibrium price* and *quantity*.
 - b. Now, add a tax of \$1.50 per unit; and find the after-tax *equilibrium price* and *quantity*.

11. Total cost, $TC = 120 + 45Q - Q^2 + 0.4Q^3$.
 Provide the identity equations for Fixed Cost (FC), Average Cost (AC), and Variable Cost (VC) using the definitions of FC, AC, and VC from your introductory micro class that we reviewed in RECO 250 during week 4.