1. Chapter 1 (Introduction to Managerial Economics)

   a. Objective of firm is to maximize profit, which corresponds to maximizing share value. Everything that we do as managerial economists is oriented toward figuring out how to make decisions that are consistent with this objective.

   b. Optimization: we find max and min for things like total revenue, total cost, and total profit by determining marginal revenue, marginal cost, and marginal profit. The marginals are the slope values for the totals. Slope values are computed by calculating first derivatives.

c. Supply, demand, and equilibrium price

1. The (negatively sloped) demand function models the relationship between the quantity demanded and price within a given period of time, holding other influences such as income, product quality, prices and product quality of substitutes and complements, advertising expenditures, etc. constant.

2. The (positively sloped) supply function models the relationship between the quantity supplied and price within a given period of time, holding other influences such as technology and costs of inputs (e.g., labor and capital) constant.

3. The price-quantity pair that is implied by the intersection of demand and supply is the "equilibrium" price-quantity pair.

2. Chapter 2 (Demand Theory)

a. Demand function relates the quantity of output (Q) as a function of the various determinants of demand; the *demand curve* is obtained by plugging in average values for all variables into the demand function other than price.

b. Elasticity measures how sensitive product demand is to changes in price, prices of complementary and substitute goods, and income.
   1. *Price elasticity of demand*: $\eta = (P/Q)(dQ/dP)$, where $-\infty < \eta \leq 0$.
      a. If $\eta < -1$, then the good is *price elastic*,
      b. if $-1 < \eta \leq 0$, then the good is *price inelastic*,
      c. if $\eta = -\infty$, then the good is *perfectly price elastic*
      d. if $\eta = 0$, then the good is *perfectly price inelastic*.

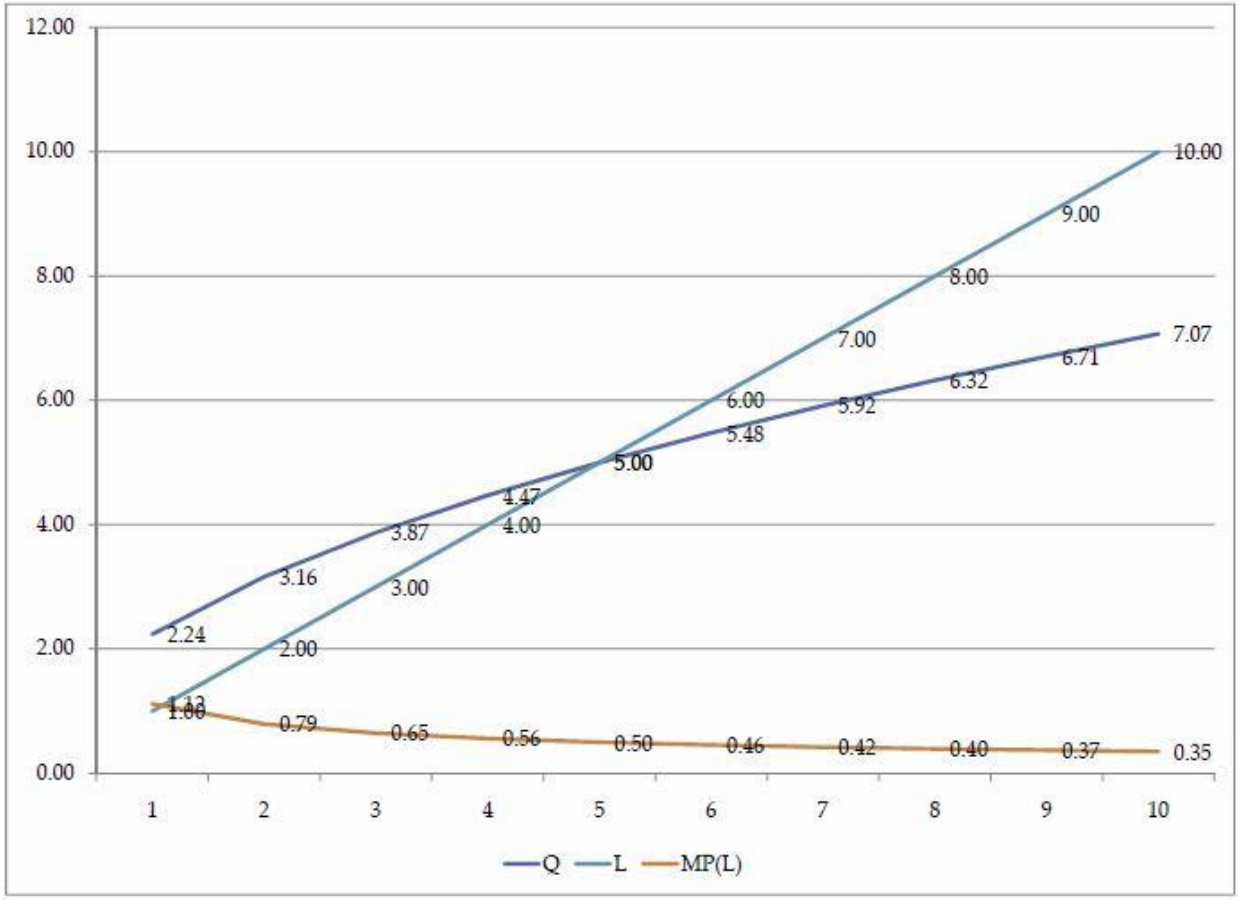
2. *Cross-Price Elasticity of Demand*: $\eta_{xy} = (P_y/Q_x)(dQ_x/dP_y)$. Here, η_{xy} measures how sensitive the demand for good x is to changes the price of good y, *cet. par*. If $\eta_{xy} > 0$, this implies that good y is a *substitute* for good x; if $\eta_{xy} < 0$, this implies that good y is a *complement* for good x.

3. Income elasticity of demand: $\eta_I = (I/Q)(dQ/dI)$.
   a. If $\eta_I > 0$, then the good is a *normal good*; i.e., the quantity demanded is positively related to changes in income, and
   b. if $\eta_I < 0$, then the good is an *inferior good*; i.e., the quantity demanded is inversely related to changes in income.

c. Total Revenue (TR), Marginal Revenue (MR), Marginal Cost (MC), Total Profit (π), and Price Elasticity (η)

1. $MR = d(PQ)/dQ = P(1 + 1/\eta)$ (see page 16 of lecture 2).
2. Profit maximizing price: $P = MC/(1 + 1/\eta)$

3. Chapter 4 (Production Theory)
   a. Law of diminishing returns - When managers add equal increments of one input while holding other input levels constant, the incremental increases in output eventually diminish. In this graph, the marginal product of labor (MP(L)) declines as more labor is used!



b. Returns to Scale – In the production function $Q = L^a K^b$, a and b represent the output elasticities of labor and capital.
   1. If $a + b < 1$, then we have *decreasing* returns to scale,
   2. If $a + b = 1$, then we have *constant* returns to scale, and
   3. If $a + b > 1$, then we have *increasing* returns to scale.

c. Isocost versus Isoquant
   1. The isocost line represents a budget constraint that management wishes to impose upon spending on labor (L) and capital (K) inputs; it indicates all possible combinations of L and K that have the same cost.
   2. The isoquant curve indicates all possible combinations of L and K that produce the same output. Therefore, by selecting L and K according to according to equation 4.6 on p. 110 of the textbook guarantees that you'll get the most output for a given cost. See the 3rd lecture synopsis for a more detailed explanation.

4. Chapter 5 (Analysis of Costs)
   a. This chapter addresses the question of how to determine *optimal firm size*, given the firm's production function and the costs of inputs such as labor and capital.
   b. Key concept: the long-run average cost (*LRAC*) curve.
      1. The *LRAC* curve is typically u-shaped; the region where it is downward sloping has increasing returns to scale, the region where it is flat has constant returns to scale, and the region where it is increasing has decreasing returns to scale.
      2. The short run average cost curve (*SRAC*) shares a similar shape; this is caused by *diminishing returns of inputs*, not increasing, constant, and decreasing returns to scale.
      3. Optimal firm size is where the *LRAC* = *LRMC*; i.e., long run average cost equals long-run marginal cost.

5. Chapter 6 (Perfect Competition)
   a. Perfect competition and monopoly are the opposite ends of the market structure continuum.
   b. All firms (irrespective of market structure) select Q which maximizes profit. Profit maximizing firms determine Q by setting $MR = MC$.
   c. Perfectly competitive firms are *price takers*, so $MR = d(PQ)/dQ = P$, which implies that $\eta = -\infty$. Output for a perfectly competitive firm occurs where $P = MR = MC$, and $TR >$ total variable cost.
   d. Perfectly competitive market dynamics
      1. Suppose the i^{th} firm has lower short-run costs than other firms; i.e., $P > MC_i$. Thus the i^{th} firm earns "excess" profits, since $P > MR_i = MC_i$.
      2. The opportunity for excess profit causes new firms to enter the market; industry output increases, price falls, and excess profits are quickly dissipated.

6. Chapter 7 (Monopoly and Monopolistic Competition)
   a. Monopolists are *price makers*, so $MR = d(PQ)/dQ = P(1 + 1/\eta)$, and $P = MC/(1 + 1/\eta)$. Therefore, $P > MR = MC$ for a monopolist, which implies that the monopolist earns monopoly profits. Monopolistic markets are characterized by higher prices and lower quantities than otherwise identically competitively structured industries.
   b. "Intermediate" cases include monopolistic competition and oligopoly.
      1. Competitors in monopolistically competitive markets sell differentiated products, have limited control over price, and there are limited entry and exit barriers.
      2. Oligopoly is characterized by a limited number of firms and high entry barriers.

7. Chapter 10 (Oligopoly)
   a. Managers of oligopolistic firms must consider (and anticipate) the actions of their rivals when they set prices.
   b. Examples shown in class (based upon duopoly)
      1. *Price War*
         a. Rival firms independently select price-quantity pairs which maximize market share.
         b. Price war produces the largest total quantity, lowest price for the market, and lowest profit for the incumbent firms.
      2. *Collusion*
         a. Firms explicitly agree to jointly maximize value as if the duopoly were a 2-plant monopoly.
         b. Collusion produces the smallest total quantity, highest price for the market, and highest total industry profit.

3. *Simultaneous Decision-Making (Cournot Equilibrium)*

   a. Rival firms do not cooperate; rather they simultaneously make profit-maximizing decisions, conditioned by what they believe each other's "best response" is.

   b. Cournot produces higher quantity and lower price than collusion, lower quantity and higher price than price war.

   c. Cournot illustrates why cartels seldom work; one of the two firms can make more profit by acting as a Cournot competitor.

4. Leader-Follower decision-making (Stackelberg Equilibrium)

a. Rather than make simultaneous moves, one firm leads and the other follows.

b. The leader makes her output choice by anticipating what the follower's output choice will be, which in turn depends upon the leader's output choice.

c. Suppose two firms are Cournot competitors; then if one firm has a cost advantage over the other, it will become the industry leader and the other firm will have little choice but to become a follower.