Problem Set 1 – Solutions

1. Use the markup pricing formula, $P = MC/[1+(1/\varepsilon)]$, remembering to insert ε as a negative number.
   a. P = 5
   b. Rise (become more elastic) as substitutes become available.

2. a. $Q_{monopoly} = 5$, $P_{monopoly} = 7.5$ (See slide #1 on notes 1.1 for relevant diagram.)
   b. $Q_{monopsony} = 4$, $P_{monopsony} = 4$ (See slide #3 on notes 1.3 for relevant diagram.)

3. a. Market demand curve has vertical intercept of 266.67 and horizontal intercept of 800. Fringe supply curve has vertical intercept of 100 and a slope of +0.5.
   b. Dominant firm's MC and AC is constant (horizontal line) at 80.
   c. 200
   d. 100
   e. This is a straight line with vertical intercept at 200 and intersecting the market demand curve at P = 100, Q = 500. The full dominant firm demand curve has a kink at this point.
   f. 300
   g. 140
   h. 18,000

4. a. P = 120 – 0.18Q
   b. 2q + 10
   c. Set MC = P
   d. 25P – 250
   e. P = 30, Q = 500
   f. q = 10 (at this level, firm profits = 0 because TR = TC = 300.)

5. a. Q = 990, P = 10 (The supply curve is horizontal.)
   b. Supply is still perfectly elastic. Demand does not change. Same outcome as (a).
   c. No. (But new firm does earn profit = 10.)
   d. Existing firms vary output, thus MC of last unit = 10.
   e. 0
   f. Yes.

6. a. 2,950 (or 2,850 if you exclude "others" from the computation.)
   b. 4,950 (or 4,850 if you exclude "others" from the computation.)

7. $\theta = [(1 - \xi)/\xi]*(1/H) = [(1 - 0.814)/0.814]*[1/0.125] = 1.828$. See Cabral's table on p. 161.

8. a. 45
   b. 220
   c. 310
   d. Q = 90, P = 220
   e. Double marginalization

9. a. w = 4,000 – 0.0001Q
   b. w = 2,000, Q = 20 million, π = 40 billion
   c. P = 3,000, Q = 20 million, π = 40 billion
   d. All market power is in the upstream business. No advantage to integrating downstream.
   e. P = 3,000 + 0.5w
   f. w = 1,500, Q = 12.5 million, π = 18.75 billion

10. a. 22.5
   b. The entrant's profit function, $\pi_E = 90q_E - 2q_Iq_E - 2q_E^2 - F$. It can be shown that this profit function is decreasing in q_I $\forall$ $q_I < 45$.
   c. The incumbent must set q_I s.t. $\pi_E = 0$. Therefore, $q_I = 2(22.5 - \sqrt{F/2}$.
   d. $L = 1 - [10/(10 + \sqrt{8F})]$. This implies that concentration rises with the amount of fixed costs.