ECON 321, Assignment 3:
BP, Chapter 2: 2.2

1. Read Section 2.2.1

2. Read Section 2.2.2 subsection "The Monopoly Pricing Formula." We went over this in class 2. For review, here's a simple example: Let $p(q) = 10 - 2.5q$ and $C(q) = q$. Then the firm maximizes $\pi(q) = (10 - 1.5q)q - q$. The first order condition is

$$\frac{d\pi(q)}{dq} = -1.5q + 10 - 1.5q = 0$$

This solves to $q^* = 3.33$. We can find $p^* = 5$. The optimized profit is

$$\pi^* = \pi(q^*) = p^* q^* - q^* = (p^* - 1)q^* = 4 \times 3.33 = 13.32$$

3. Read the subsections "Monopoly Pricing: Several Goods" and "Linked Demands, Unlinked Costs." The book models these topics using p as the choice variable instead of q. Since we've been working with q so far, let's do an example where the firm chooses q.

4. Let the inverse demand system be

$$p_1(q_1, q_2) = 10 - 2q_1 - q_2 \qquad p_2(q_1, q_2) = 10 - q_1 - 2q_2 \qquad (1)$$

and let the cost function be $C(q) = q$.

5. Write down the profit function of this 2-product firm.

6. Verify that *if* this firm set $q_1 = q_2 = 1.67$ it could replicate the monopoly price and profit found in step 2.

7. Write the first order conditions for the profit max of step 5 and solve simultaneously to find q_1^*, q_2^*, p_1^*, and p_2^*. Find π^*.