Chapter 11

1. Suppose that a monopolist operates in an industry where the demand curve is given by $Q_D = 1000 - 20P$. The firm's marginal cost is constant at \$10.

   (a) Find the monopolist's marginal revenue curve. (*Note:* it will be easier if you rewrite the market demand curve with P as a function of Q).

   (b) Find the monopolist's profit maximizing level of output.

   (c) Find the monopolist's profit maximizing price.

   (d) Find the consumer and producer surplus in this market.

2. Assume that a monopolist sells a product with a total cost function $TC = 1200 + 0.5Q^2$ and a corresponding marginal cost function $MC = Q$. The market demand curve is given by $P = 300 - Q$

   (a) Find the monopolist's marginal revenue curve.

   (b) Find the monopolist's profit maximizing level of output.

   (c) Find the monopolist's profit maximizing price.

   (d) Find the monopolist's marginal cost at the profit-maximizing level of output.

   (e) Find the price elasticity of demand for this market at the profit-maximizing price and quantity. Does the inverse elasticity pricing rule hold? (Remember that price elasticity of demand is $\frac{\partial Q}{\partial P}\frac{P}{Q}$.)

3. Suppose that a single-price monopolist faces the demand curve $P = 100 - Q + \frac{1}{10}I$, where I is average weekly household income, and that the firm's marginal cost function is given by $MC(Q) = 2Q$

   (a) If the average weekly household income is \$600, then what is the firm's profit-maximizing quantity of output? At what price will the firm sell that output?

   (b) What will be the consumer and producer surplus in the market?

   (c) Now suppose that average weekly household income rises by \$400. Find the new profitmaximizing quantity and price for the monopolist.

   (d) Find the consumer and producer surplus in the market following the increase in household income.

   (e) Finally, suppose that, as a result of higher wages in the area, the firm's marginal cost of production has increased to $MC = 3Q$. Taking into account both the increased marginal cost, and the increase in average household income, find the new profit-maximizing price and quantity.

   (f) Find the new consumer and producer surplus in the market.