Econ 310 Week 11 Homework
Due: Tuesday 11/12

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1. For each of the following examples of a monopoly, say what the barrier to entry is.

   a. A power company that is the only power provider in its region.

   b. A pharmaceutical company that owns the patent on a drug.

   c. A chemical company that owns a secret formula (but does not have a patent).

   d. A social media platform with a dominant market position.

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2. A commodity q is supplied by a monopolist with cost function:

$$c(q) = 32 + 4q + q^2$$

The monopolist faces a market demand curve given by:

$$Q_d = 14 - \frac{1}{2}p$$

Find the profit maximizing price and quantity. What is the maximum profit?

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3. A commodity q is supplied by a monopolist with cost function:

$$c(q) = 22 + 8q$$

A representative consumer with income $Y = 400$ has a utility function over numeraire consumption c and commodity q given by:

$$u(c, q) = c + 24q - q^2$$

a. Write down the demand curve faced by the monopolist.

b. Find the profit maximizing price and quantity. Calculate firm profit and consumer utility at this point.

c. What is the efficient quantity? Calculate price, firm profit, and consumer utility at the efficient quantity.

d. What is the deadweight loss caused by the monopoly?

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4. For each of the following situations, say whether it is an example of price discrimination or not.

a. A health insurance company charges higher premiums in different neighborhoods.

b. Uber charges different rates depending on the size of the car and time of the day.

c. Apple charges lower prices on its Macbook computers to students.

d. An airline charges more for seats with extra legroom.

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5. A commodity q is supplied by a monopolist with total cost function:

$$c(Q) = 3Q$$

There are two representative consumers.

Representative consumer 1 has income $Y_1 = 500$ and utility function over their numeraire consumption c_1 and their commodity consumption q_1 given by:

$$u_1(c_1, q_1) = c_1 + 17q_1 - \frac{1}{2}q_1^2$$

Representative consumer 2 has income $Y_2 = 500$ and utility function over their numeraire consumption c_2 and their commodity consumption q_2 given by:

$$u_2(c_2, q_2) = c_2 + 35q_2 - q_2^2$$

a. If the firm can price discriminate, what price would it charge to each consumer?

b. Calculate the total profit with price discrimination.

c. Suppose the firm cannot price discriminate. Write down the market inverse demand curve it faces.

d. Find the profit maximizing price when the firm cannot price discriminate.

e. Calculate total profit without price discrimination.