Dr. Barry Haworth
University of Louisville
Department of Economics
Honors Economics 201-01
Fall 2018

Homework #4 (due by 9:00pm on Monday, November 19)

*Please submit your answers to this homework through the Assignment link at Blackboard. **No credit will be given for answers submitted in class or emailed to the professor**, regardless of the excuse.* This includes unique excuses like the police confiscated my computer right before I was going to submit it, excuses like "I lost my Internet", etc. Please note that all submissions are final, again – regardless of the excuse (which includes "I accidentally hit the submit button"). Note that Blackboard allows you to save your answers, but you must hit the "Save and Submit" button to submit your answers. If you are unfamiliar with Blackboard, then it would be a good idea to visit the class page at Blackboard and check out the homework assignments as they are posted.

Please note that when Blackboard grades homework answers, more specifically – answers to the fill-in-the-blank questions – your answer must match exactly with the answer that Blackboard is looking for. Below, you'll find some instructions on how to properly format these answers. Reading this section is strongly recommended.

Homework Questions 1, 2 and 5
Formatting matters with the answers in these questions. For this reason, **understand that your answer can be technically correct but graded as wrong because you didn't follow the directions provided below.** Given that formatting is considered part of your answer, a wrongly formatted answer is still a wrong answer.

Please note the following comments below.

 (a) ***On Question #1c, 1d, 2a, 2c, 5a and 5b***, *please express your answer in terms of dollars, **not** dollars and cents. E.g., if you calculate 30.001 for your answer to one of these four questions, then you should express that answer as $30 and not $30.00.*

(b) ***On Question #1c, 1d, 2a, 2c, 5a and 5b***, *please express any negative answer with the negative sign in front of the dollar sign and do not put a space between the negative sign and dollar sign. E.g., if you calculate -30 for your answer to one of these four questions, then you would express that answer as -$30 and not - $30.*

(c) ***On Questions #1a, 1b and 2b***, *please round your answer (if necessary) to the nearest whole unit (integer). E.g., if you calculate 24.22 for your answer to one of these two questions, then you would express your answer as 24.*

Homework #4 Questions

1. Assume that a firm operates as a profit maximizing monopolist that produces and sells widgets, and that this firm has the following Demand and Marginal Revenue curves below.

       P = 250 - 5Q   (Demand)
       MR = 250 - 10Q   (Marginal Revenue)

where P = Price, Q = Quantity

a. Let's assume further that this firm sells all of its widgets at the same price. Although you don't have the MC and AC curves, if you take the demand and marginal revenue curves as given, what would be the greatest quantity of output that the firm would ever want to sell if the firm behaved as a **price taking firm** (i.e. if the firm behaved as though it was actually a perfectly competitive market) and sold every unit at the same price? _____

b. Now assume that the firm will behave as a traditional **price setting monopoly firm.** Approaching this as you did above in part a, what would be the greatest quantity of output this same firm would ever want to sell under the one price for each unit sold pricing strategy if the firm behaved as a price setting firm?

_____

For each part below (c and d), assume that you now know MC = AC = 50 for this firm
c. If the firm sells widgets all for the same price, then (given the curves mentioned here) the greatest possible profit that the firm can earn in this market would be equal to _____

d. Now, suppose this firm decides to set 2 different prices. Knowing that customers who buy widgets on weekdays are willing to pay a higher price for widgets (Group 1) than customers who buy their widgets on the weekend (Group 2), the firm sets the following prices:

- the weekday price for consumers in Group 1 is $180
- the weekend price for consumers in Group 2 is $130

Assume that consumers fit into one or the other of these two groups, based on their willingness to pay for widgets. Assume further that the firm can successfully engage in a pricing strategy of price discrimination. If the firm pursues this pricing strategy, answer the following:

   i. The profit earned from Group 1 (the group facing the $180 price) is equal to _____

   ii. The profit earned from Group 2 (the group facing the $130 price) is equal to _____

   iii. The combined profit from both groups is equal to _____

2. Assume that a firm named "Don't be Naked & Afraid" has a monopoly on the sale of clothing for people who wander naked and afraid around the wilderness for 20-40 days. The equations below provide demand and cost-related information associated with selling this good:

$P = 70 - 2Q$ (Demand)
$MR = 70 - 4Q$ (Marginal Revenue)
$MC = 10$ (Marginal Cost)
$AC = 10 + (120/Q)$ (Average Cost)

a. Let's assume this firm sells every unit at the same price. Under this pricing strategy, the greatest possible profits the firm can earn are equal to _____

Suppose the government believes that even naked people wandering around the wilderness should be able to buy clothing at "cost" and, as a result, the government sets this firm's price equal to their marginal cost (i.e. P = $10).

b. Under this $10 price control, the firm will sell _____ units of clothing.

c. Under this $10 price control, the firm's profit is equal to _____

3. Consider the widget-selling firm from question #1 and the clothing-selling firm from question 2. Given what you know about these firms, which of the following is a true statement:
   (a) the widget-selling firm and clothing-selling firm are both natural monopolies
   (b) the widget-selling firm is a natural monopoly, but not the clothing-selling firm
   (c) the clothing-selling firm is a natural monopoly, but not the widget-selling firm
   (d) neither the clothing-selling firm nor the widget-selling firm is a natural monopoly.

4. A monopolist has the following Demand and Marginal Revenue equations:

$P = 750 - 2Q$ (Demand)
$MR = 750 - 4Q$ (Marginal Revenue)

Assume that this monopoly is a profit maximizing firm who is only willing to sell each unit at the same price. Once the firm decides on an output level, the firm must set a price. Given the demand and marginal revenue equations above, what is the lowest price this firm will ever set:
   (a) P = $500
   (b) P = $450
   (c) P = $425
   (d) P = $400
   (e) P = $375
   (f) P = $350
   (g) none of the above

5. Assume that a monopoly firm has the following demand, marginal revenue and cost equations:

$$P = 750 - 2Q \qquad \text{(Demand)}$$
$$MR = 750 - 4Q \qquad \text{(Marginal Revenue)}$$
$$AC = 50 \qquad \text{(Average Cost)}$$
$$MC = 50 \qquad \text{(Marginal Cost)}$$

a. Under the one price for every unit sold pricing strategy, the firm's greatest possible profit would be _____

b. Assume that this firm is considering the use of a two-part tariff. If the total profit from the two part tariff is greater than what occurs in part a, then the monopolist will switch pricing strategies.

Assume that in implementing the two part tariff, the firm sets P = $50, and knows that they can collect all of what would be the maximum potential fixed fee revenue available at that price.

Under this two part tariff, the firm's overall profit would be _____

(For 5a and 5b, record your answer in terms of whole dollars, e.g. $100, not $100.00)

The following information can be used to answer Questions #6-8.

There's a totally awesome show called Dance Moms that is no longer on TV, but which starred an abusive dance teacher with some (often) self-serving moms who have daughters that dance as part of an elite dance team. The moms are in what seems like a constant battle with the dance teacher over issues that range from the teacher's abusive treatment to poor effort by the teacher when it comes to the teacher helping their daughter become a star.

Assume you have 2 moms, Mom #1 and Mom #2, and that one day the dance teacher makes a derogatory comment at practice about Mom #1's daughter. The moms have discussed how they should stand up to the dance teacher, but both know that if they do stand up to her, there will be major repercussions. E.g., the dance teacher is very likely to treat that daughter with even more contempt and will very likely not consider her for solo dances at the next dance competition. Not doing solo dances would be bad for the child and ultimately the Mom, because dance solos are much coveted opportunities for the dancers to be highlighted, which increases that dancer's ability to become famous. Of course, if one mom stands up to the dance teacher and protests the treatment of Mom #1s child, the other mom's daughter will receive any opportunity that the dance teacher takes from the child of the mother who stood up to the dance teacher. In effect, this becomes a battle between acting on principle vs acquiescing to what you perceive as abuse, in order to help your child succeed. The strategies for these players are as follows:

- **Strategy #1** is <u>Fight</u> – where a player stands up against the dance teacher to protest the treatment of Mom #1's child
- **Strategy #2** is <u>Acquiesce</u> – where a player chooses to say nothing about the treatment of Mom #1's child, and effectively take sides with the dance teacher

We'll assume that this is a one-period game with complete information, where each player is interested in maximizing their own payoff. The payoffs in this game are "net satisfaction", which is the difference between the benefit and cost associated choosing a strategy.

Given the strategies and discussion above, here are the four possible outcomes of this game (explanations for these outcomes are provided below as well):

(Outcome 1) Mom #1 chooses *Fight* and Mom #2 chooses *Fight*, where Mom #1 earns 4 units of net satisfaction and Mom #2 earns 4 units of net satisfaction.

(Outcome 2) Mom #1 chooses *Acquiesce* and Mom #2 chooses *Acquiesce*, where Mom #1 earns 3 units of net satisfaction and Mom #2 earns 3 units of net satisfaction.

(Outcome 3) Mom #1 chooses *Fight* and Mom #2 chooses *Acquiesce*, where Mom #1 earns 2 units of net satisfaction and Mom #2 earns 5 units of net satisfaction.

(Outcome 4) Mom #1 chooses *Acquiesce* and Mom #2 chooses *Fight*, where Mom #1 earns 1 units of net satisfaction and Mom #2 earns 1 unit of net satisfaction.

6. What will be the outcome if this is played as a **simultaneous game**?
    (a) Mom #1 will choose Fight, and Mom #2 will choose Fight (Outcome #1)
    (b) Mom #1 will choose Acquiesce, and Mom #2 will choose Acquiesce (Outcome #2)
    (c) Mom #1 will choose Fight, and Mom #2 will choose Acquiesce (Outcome #3)
    (d) Mom #1 will choose Acquiesce, and Mom #2 will choose Fight (Outcome #4)

7. This question utilizes the information from question #6 (above). The difference here is that we will assume the game is played as a one period sequential game (rather than as a simultaneous game). We will continue to assume that there is complete information and that the players will make choices which maximize their own net satisfaction.

What is the outcome if this game is played as a **sequential game with Mom #1 moving first**?
    (a) Mom #1 will choose Fight, and Mom #2 will choose Fight (Outcome #1)
    (b) Mom #1 will choose Acquiesce, and Mom #2 will choose Acquiesce (Outcome #2)
    (c) Mom #1 will choose Fight, and Mom #2 will choose Acquiesce (Outcome #3)
    (d) Mom #1 will choose Acquiesce, and Mom #2 will choose Fight (Outcome #4)

8. Utilizing the information from question #6 (above), what is the outcome if this is played as a **sequential game with Mom #2 moving first**?
    (a) Mom #1 will choose Fight, and Mom #2 will choose Fight (Outcome #1)
    (b) Mom #1 will choose Acquiesce, and Mom #2 will choose Acquiesce (Outcome #2)
    (c) Mom #1 will choose Fight, and Mom #2 will choose Acquiesce (Outcome #3)
    (d) Mom #1 will choose Acquiesce, and Mom #2 will choose Fight (Outcome #4)

Note that there are diagrams on the final page that you can use to answer questions 6-8.

As an aid, the figures which go with Questions #6-8 are also provided on the next page. Note that you can use the figures below to answer each question.

6)

Mom #2

	Fight	Acquiesce
Fight	NB_1, NB_2 4, 4	NB_1, NB_2 2, 5
Acquiesce	NB_1, NB_2 1, 1	NB_1, NB_2 3, 3

Mom #1 (row label)

7)

$$\underline{NB_1} \quad \underline{NB_2}$$

Mom #2

Fight → 4 4

Acquiesce → 2 5

Fight → 1 1

Acquiesce → 3 3

Mom #1

Fight (upper branch), Acquiesce (lower branch)

8)

$$\underline{NB_2} \quad \underline{NB_1}$$

Mom #1

Fight → 4 4

Acquiesce → 1 1

Fight → 5 2

Acquiesce → 3 3

Mom #2

Fight (upper branch), Acquiesce (lower branch)