

Dr. Barry Haworth
University of Louisville
Department of Economics
Economics 201
Spring 2026

Homework #5 (due by 9:00pm on Tuesday, April 14)

*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 my dog ate my homework, as well as more traditional excuses like “I lost my Internet”. Please note that all submissions are final, again – regardless of the excuse (which includes “I accidentally hit the submit button”) and that if you do not correctly submit your work, then you will not receive credit. I.e., Blackboard has a Submit button and a Save and Close button, and you must use the 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 answers to the fill-in-the-blank questions – your answer must match exactly with the answer that Blackboard is looking for or your answer will be considered incorrect. You’ll always be given formatting instructions and you must follow those instructions. Below, you’ll find some instructions on how to properly format your answers to these type of questions. A more complete discussion of these rules is provided at Blackboard. Reading that section is strongly recommended.

As stated above, given that answers to the fill-in-the-blank questions must not only be correct, but formatted properly, correct formatting is part of the process. A wrongly formatted answer is still a wrong answer. I.e., you will not have points added to your homework score if you got answers wrong due to formatting mistakes. However, this is still something you will want to bring to Professor Haworth’s attention. *In addition, if you are unsure how to round an answer (e.g. whether 3.25 rounds to 3.2 or 3.3), then please contact Professor Haworth.*

Homework #3 formatting instructions:

*(a) **Question #9:** please express your answer as a whole number (with or without the \$). If you get a negative answer, then include the negative sign before your answer. I.e., do not include a space between the negative sign and your answer. E.g., a loss of \$55 should be written as -\$55 or -55 and not - \$55, \$-55 or - 55.*

Homework #5 Questions

1. The question below can be answered by reading the article “Drugs: Sports Prisoners Dilemma.” This article is located within the Homework #5 folder at Blackboard.

Find the article, read it, and then answer the following question below.

This article characterizes the individual decision for athletes to take performance enhancing drugs as part of a Prisoners Dilemma where each player has two strategies, to take drugs vs not take drugs. Based on what the article says and what we know about this type of game, which of the following would be a true statement::

- a. for each player, not taking drugs is a dominant strategy
- b. the choice to take drugs is always better for each player than the choice to not take drugs
- c. the outcome where the players choose different strategies is always better for the player choosing to not take drugs
- d. if there was trust between the players in this game, then we could resolve their Prisoners Dilemma
- e. all of the above
- f. answers b and d are correct
- g. answers b, c and d are correct

2. The question below can be answered after reading the article “Being Better vs. Being Different” This article can be located within the Homework #5 folder at Blackboard.

Read the article and then answer the following question below.

This article discusses product differentiation within the hotel industry. Based on what the article says, which of the following would be a true statement:

- a. horizontal differentiation is a more effective strategy than vertical differentiation when competition intensifies
- b. vertical differentiation can allow a company to raise its prices and escape competitive pressure
- c. horizontal differentiation can allow a company to raise its prices and escape competitive pressure
- d. vertical differentiation is achieved when a company offers a product or service with unique attributes that satisfy a particular customer segment
- e. both horizontal differentiation and vertical differentiation give rise to higher prices, but the vertical differentiation strategy is the one associated with the highest prices
- f. all of the above
- g. answers a, b and c are correct
- h. answers b, c and e are correct
- i. answers b, c, d and e are correct
- j. answers a, b, c and e are correct

Questions #3-8 are multiple choice questions about material we covered in class.

3. Which of the following is true about a market with monopolistic competition:

- a. all firms within the market will sell heterogeneous goods
- b. the market does not have any barriers to entry and exit
- c. strategic behavior amongst firms is the key defining characteristic of monopolistic competition
- d. all firms within the market sell at a price that is greater than marginal cost
- e. all of the above
- f. answers a and b are correct
- g. answers a, b and c are correct
- h. answers a, b and d are correct

4. Which of the following statements is true in the short run about firms who operate in a market with monopolistic competition:

- a. firms will produce where $P = MC$
- b. if each firm in this market sets the same price for every unit that the firm sells, then each of these firms will generate some deadweight loss no matter how low their price
- c. firms in this market will always earn economic profit equal to zero
- d. all of the above are correct
- e. answers b and c are correct
- f. answers a and b are correct

5. Which of the following is the best example of a product with horizontal differentiation:

- a. banks, where consumers will choose to use banks with the greatest number of available services
- b. automobiles, in situations where – for a given type of car – consumers will purchase the car with the best possible warranty
- c. clothing, where consumers will purchase clothing that best fits their personal preferences
- d. gas stations, where consumers will choose to buy gasoline at the station closest to them
- e. all of the above

6. Which of the following is true about an "oligopoly market":

- a. all firms within the market will always sell heterogeneous goods
- b. this market does not have any barriers to entry and exit
- c. strategic behavior amongst firms is the key defining characteristic of this type of market
- d. all firms within the market will sell at a price that is greater than marginal cost
- e. firms within the market will always earn zero economic profit in the short run
- f. all of the above
- g. answers c and d are correct
- h. answers a, b and d are correct
- i. answers a, b, d and e are correct

7. Assume that a manufacturing firm produces plastic car parts, and that the firm's marginal cost is less than what we believe society's marginal cost should be within this market. In this situation, which of the following would be a true statement:

- a. this manufacturing firm is producing more plastic car parts than what society would prefer
- b. this manufacturing firm is producing less plastic car parts than what society would prefer
- c. this manufacturing firm has created a positive externality
- d. this manufacturing firm has created a negative externality
- e. answers a and c are correct
- f. answers a and d are correct
- g. answers b and c are correct
- h. answers b and d are correct

8. Assume that a university's nursing school creates a lot of external benefit. Which of the following would be a correct statement about this situation:

- a. this situation would be a negative externality
- b. the marginal benefit of nursing students at this university is greater than society's marginal benefit in this situation
- c. this situation would be a positive externality
- d. the marginal benefit of nursing students at this university is less than society's marginal benefit in this situation
- e. answers a and b are correct
- f. answers a and d are correct
- g. answers c and d are correct

9. Assume that a monopolist faces the following equations below for demand, marginal revenue, total cost and marginal cost (*note that we're using TC instead of AC below*). You'll also want to look at the formatting instructions for this question.

Demand:	$P = 800 - 3Q$
Marginal Revenue:	$MR = 800 - 6Q$
Total Cost	$TC = 500Q + 500$
Marginal Cost	$MC = 500$

Assume that the government chooses to use rate regulation with this firm.

- a. If the government uses average cost pricing with this firm, then this firm will earn profit equal to _____
- b. If the government uses marginal cost pricing with this firm, then this firm will earn profit equal to _____

The following information can be used to answer Question #10.

Assume that you have a situation where 2 people (Sue and Emily) are deciding whether to join a local union. Assume further that this game is played over just one period with complete information. The players both have 2 strategies, they can join the union (i.e. **join**) or not join the union (i.e. **not join**).

If one player chooses to join and the other not join, then both get the benefit of a weaker union (since everyone's paid the same), but joining the union means paying dues, so joining has a cost and not joining has zero cost. If both players join the union, then there's a higher benefit from a stronger union, but both have the cost of paying dues. If neither player joins the union, then their benefit is low, but at zero cost. In this game, we'll assume that the payoffs are in terms of net benefit (NB), and that greater net benefit is preferred to less net benefit.

Given the outcomes outlined above, with the payoffs for each player. Note that the figure below also provides this information and can be used to answer this question.

Outcome 1: Sue votes to join the union and Emily votes to join the union, and as a result, Sue gets 6 units of net benefit ($NB_S = 6$) and Emily gets 6 units of net benefit ($NB_E = 6$)

Outcome 2: Sue votes to join the union and Emily votes to not join the union, and as a result, Sue gets 3 units of net benefit ($NB_S = 3$) and Emily gets 7 units of net benefit ($NB_E = 7$)

Outcome 3: Sue votes to not join the union and Emily votes to join the union, and as a result, Sue gets 7 units of net benefit ($NB_S = 7$) and Emily gets 3 units of net benefit ($NB_E = 3$)

Outcome 4: Sue votes to not join the union and Emily votes not join the union, and as a result, Sue gets 4 units of net benefit ($NB_S = 4$) and Emily gets 4 units of net benefit ($NB_E = 4$)

10. If the game is played as a **simultaneous game**, then what will be the outcome?

- (a) Sue votes to **join** the union, and Emily votes to **join** the union (Outcome #1)
- (b) Sue votes to **join** the union, and Emily votes to **not join** the union (Outcome #2)
- (c) Sue votes to **not join** the union, and Emily votes to **join** the union (Outcome #3)
- (d) Sue votes to **not join** the union, and Emily votes to **not join** the union (Outcome #4)

		Emily	
		Join	Not Join
Sue	Join	NB_S, NB_E 6, 6	NB_S, NB_E 3, 7
	Not Join	NB_S, NB_E 7, 3	NB_S, NB_E 4, 4

The following information can be used to answer Question #11.

Assume that you have a professor and student playing a game we'll call "the Final Exam game". Assume further that the game is played over just one period (e.g. final 4 weeks of the semester) and that this is a game with complete information.

Our student has two strategies. The student can **work hard**, which carries greater benefit, but at a much higher cost, or the student can **goof off**, which carries much less benefit, but at zero cost. Similarly, the professor also has two strategies. The professor can write a **hard exam**, which takes greater effort, at a correspondingly higher cost to the professor, but significant benefit as well, since writing a harder exam gives the professor more street cred (i.e. as a professor who takes learning seriously) amongst future students and fellow professors. Or, the professor could write an **easy exam**, which takes little effort and provides a negligible benefit to the professor.

Given the strategies outlined above, we have four possible outcomes. Note that the figure below also provides this information and can be used to answer this question.

Outcome 1: professor chooses easy exam and student chooses work hard, giving the professor 5 units of net benefit ($NB_P = 5$) and the student 4 units of net benefit ($NB_S = 4$)

Outcome 2: professor chooses easy exam and student chooses goof off, giving the professor 3 units of net benefit ($NB_P = 3$) and the student 5 units of net benefit ($NB_S = 5$)

Outcome 3: professor chooses hard exam and student chooses work hard, giving the professor 4 units of net benefit ($NB_P = 4$) and the student 3 units of net benefit ($NB_S = 3$)

Outcome 4: professor chooses hard exam and student chooses goof off, giving the professor 2 units of net benefit ($NB_P = 2$) and the student 2 units of net benefit ($NB_S = 2$)

11. What will be the outcome if this is played as a **simultaneous game**?

- (a) Professor will choose **easy exam**, and student will choose **work hard** (Outcome #1)
- (b) Professor will choose **easy exam**, and student will choose **goof off** (Outcome #2)
- (c) Professor will choose **hard exam**, and student will choose **work hard** (Outcome #3)
- (d) Professor will choose **hard exam**, and student will choose **goof off** (Outcome #4)

		Student	
		Work hard	Goof off
Professor	Easy exam	NB_P, NB_S 5, 4	NB_P, NB_S 3, 5
	Hard exam	NB_P, NB_S 4, 3	NB_P, NB_S 2, 2

The following information can be used to answer Questions #12-13.

Assume 2 individuals, Bill and Ted, are stranded on an island, where low night temperatures require that they gather wood for a camp fire. These 2 players must decide whether to work hard, collecting a lot of wood, or slack. We'll characterize those choices as **work hard** vs **slack**. We'll assume that working hard helps create the benefit of a better, warmer fire, but that working hard involves the cost of effort associated with all that work. Of course, slacking leads to a weaker fire, but at a very minimal effort cost.

We will characterize the payoffs for each player as the Net Benefit they derive from each of the four possible outcomes. Bill's Net Benefit is expressed as NB_B , and Ted's Net Benefit is expressed as NB_T . Here are the 4 possible outcomes in this game, along with the payoffs that these players receive in each outcome (where more net benefit is preferred to less net benefit).

- **Outcome 1:** Bill chooses to work hard and Ted chooses to work hard.
As a result, we get the following payoffs: $NB_B = 5$, $NB_T = 5$
- **Outcome 2:** Bill chooses to work hard and Ted chooses to slack.
As a result, we get the following payoffs: $NB_B = 4$, $NB_T = 6$
- **Outcome 3:** Bill chooses to slack and Ted chooses to work hard.
As a result, we get the following payoffs: $NB_B = 5.5$, $NB_T = 4$
- **Outcome 4:** Bill chooses to slack and Ted chooses to slack.
As a result, we get the following payoffs: $NB_B = 1$, $NB_T = 1$

Let's assume that Bill and Ted work in shifts (i.e. one of them goes out to gather wood, and when he returns, the other one goes out to gather wood). I.e., let's assume this game is played as a sequential game. The questions below ask for the outcome of this game when one player is designated as the first mover (i.e. first shift), vs the other player.

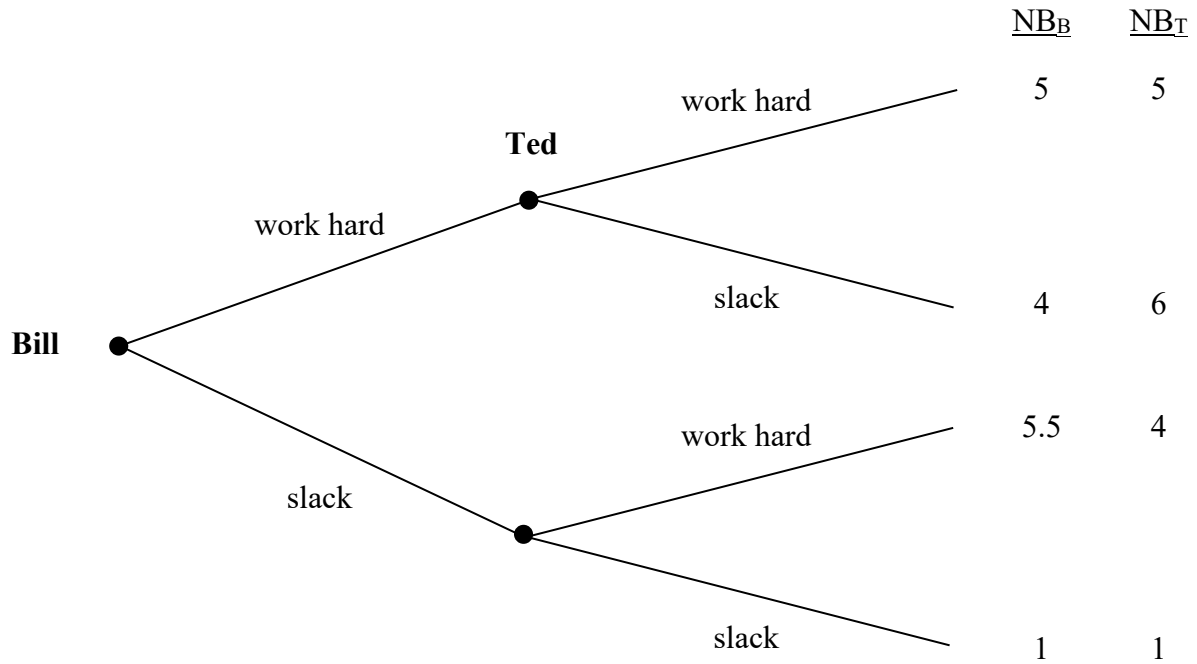
12. What will be the outcome of this sequential game when Bill is the first mover?

- a. Outcome 1: Bill chooses to work hard and then Ted chooses to work hard
- b. Outcome 2: Bill chooses to work hard and then Ted chooses to slack
- c. Outcome 3: Bill chooses to slack and then Ted chooses to work hard
- d. Outcome 4: Bill chooses to slack and then Ted chooses to slack

13. What will be the outcome of this sequential game when Ted is the first mover?

- a. Outcome 1: Ted chooses to work hard and then Bill chooses to work hard
- b. Outcome 2: Ted chooses to work hard and then Bill chooses to slack
- c. Outcome 3: Ted chooses to slack and then Bill chooses to work hard
- d. Outcome 4: Ted chooses to slack and then Bill chooses to slack

The game tree associated with the game in **Question 11** is provided below.



The game tree associated with the game in **Question 12** is provided below.

