

Homework 5 – KEY

Average: 83.9 + Opts GI bonus

Due on 19/9/2023, by 23:00

This assignment is optional but STRONGLY RECOMMENDED. If you do not submit the answers till the deadline, the score of your final exam will substitute for the score for this assignment. Submit only the correct letter for each task on eLearn under 'Quizzes' within 'COR2100-Economics and Society G7-8-26-49'. Note that the actual text of questions and answers is not supposed to appear on the eLearn quiz. You have unlimited attempts. The system is programmed to credit your last attempt. Be informed that if you submit an attempt and afterwards you re-open the quiz, you must submit your answers AGAIN. Otherwise, the system will grade the unfinished attempt with 0 (because it is the last one) and there is NOTHING I can do to fix this after the fact. Late homework or homework submitted outside eLearn cannot be accepted as this would violate SMU official policy for fairness and transparency in grading. This assignment is protected by Grade Insurance™: If the assignment's average turns out to be below 75, an equal amount of bonus points will be given to every work, for the average to become 75. Direct any homework questions to your TA.

Scenario 5.1: Firm 1 and firm 2 share a market with demand $p = 1,600 - 5Q$, where Q denotes the total quantity sold in the market. Each firm's cost is $FC = \$2,000$ and $MC = 100$.

1. ✓ According to scenario 5.1, if the two firms acted as PC competitors, what quantity would each sell?

- A. Around 25 units.
- B. Around 50 units.
- C. Around 75 units.
- D. Around 100 units.
- E. Around 125 units.

99% **F. Around 150 units.**

[They will set $p = MC$ or $1,600 - 5Q = 100$ or $5Q = 1,500$ or $Q = 300$. Thus, each firm will sell 150 units]

2. ✓ According to scenario 5.1, if the two firms act as PC competitors, what will the price be?

99% **A. Around \$100.**

- B. Around \$200.
- C. Around \$300.
- D. Around \$400.
- E. Around \$500.
- F. Around \$600.

[Price will be equal to the MC. Thus, $p = \$100$]

3. (3) According to scenario 5.1, if the two firms acted as PC competitors, what would the profit for each firm be?

- A. Around -\$4,000.
- 71% **B. Around -\$2,000.**
- 26% **C. Zero.**
- D. Around \$2,000.
- E. Around \$4,000.
- F. We need more information to answer.

[Since MC is constant, every next unit costs the same and therefore AVC should be also constant and equal to the MC. Thus, the profit could be calculated as $(p - AVC) \cdot q - FC = (100 - 100) \cdot 150 - 2,000 = -\$2,000$]

4✓ According to scenario 5.1, if the two firms competed in quantities and knowing that at equilibrium they would produce equal quantities, how much would each firm produce?

- A. Around 25 units.
- B. Around 50 units.
- C. Around 75 units.
- 95%D. Around 100 units.**
- E. Around 125 units.
- F. Around 150 units.

[We can solve this for the first firm as: $MR_1 = MC$ or $1,600 - 5q_2 - 10q_1 = 100$ or $10q_1 = 1,500 - 5q_2$ or $q_1 = 150 - 0.5q_2$, which is the optimal reaction function for firm 1. Since we know that at equilibrium $q_1 = q_2$, we can write $q_1 = 150 - 0.5q_1$ or $q_1 = 100$, which implies that $q_2 = 100$, as well]

5✓ According to scenario 5.1, if the two firms compete in quantities, what will the price be?

- A. Around \$100.
- B. Around \$200.
- C. Around \$300.
- D. Around \$400.
- E. Around \$500.
- 93%F. Around \$600.**

[Price will again be given by the demand curve: $p = 1,600 - 5 \cdot (100 + 100) = \600]

6✓ According to scenario 5.1, if the two firms compete in quantities, what will the profit for each firm be?

- A. Around \$10,000.
- B. Around \$20,000.
- C. Around \$30,000.
- D. Around \$40,000.
- 86%E. Around \$50,000.**
- F. Around \$60,000.

[The profit can be calculated as $(p - AVC) \cdot q - FC = (600 - 100) \cdot 100 - 2,000 = \$48,000$]

7✓ According to scenario 5.1, if the two firms colluded, what would the total quantity in the market (Q) be?

- A. Around 25 units.
- B. Around 50 units.
- C. Around 75 units.
- D. Around 100 units.
- E. Around 125 units.
- 92%F. Around 150 units.**

[The $MR = 1,600 - 10Q$, must be equal to the MC . That is, $1,600 - 10Q = 100$ or $Q = 150$]

8✓ According to scenario 5.1, if the two firms colluded, what would the price be?

- A. Around \$450.
- B. Around \$550.
- C. Around \$650.
- D. Around \$750.
- 98%E. Around \$850.**
- F. Around \$950.

[Price will be calculated by the demand curve: $p = 1,600 - 5 \cdot 150$ or $p = \$850$]

9. ✓ According to scenario 5.1, if the two firms colluded, what would profit be for each firm?

- A. Around \$15,000.
- B. Around \$25,000.
- C. Around \$35,000.
- D. Around \$45,000.
- 89% E. **Around \$55,000.**
- F. Around \$65,000.

[Each firm will produce $150/2 = 75$ units. The profit can be calculated as $(p - AVC) \cdot q - FC = (850 - 100) \cdot 75 - 2,000 = \$54,250$]

10. ✓ According to scenario 5.1, the two firms collude but firm 1 decides to 'cheat' while it believes that firm 2 will not cheat. How much will firm 1 produce?

- A. Around 50 units.
- B. Around 70 units.
- C. Around 90 units.
- 92% D. **Around 110 units.**
- E. Around 130 units.
- F. Around 150 units.

[Firm 1 will assume that $q_2 = 75$ and will plug this into its reaction function: $q_1 = 150 - 0.5q_2$ or $q_1 = 150 - 0.5 \cdot 75$ or $q_1 = 112.5$]

11. ✓ According to scenario 5.1, the two firms collude but firm 1 decides to 'cheat' while it correctly believes that firm 2 will not cheat. What will the price be?

- A. Around \$450.
- B. Around \$550.
- 93% C. **Around \$650.**
- D. Around \$750.
- E. Around \$850.
- F. Around \$950.

[Price will again be given by the demand curve: $p = 1,600 - 5 \cdot (112.5 + 75) = \662.5]

12. ✓ According to scenario 5.1, the two firms collude but firm 1 decides to 'cheat', while it correctly believes that firm 2 will not cheat. By how much will the profit of firm 1 exceed that of firm 2?

- A. Around \$10,000.
- 88% B. **Around \$20,000.**
- C. Around \$30,000.
- D. Around \$40,000.
- E. Around \$50,000.
- F. Around \$60,000.

[Profit for firm 1 is $(p - AVC) \cdot q - FC = (662.5 - 100) \cdot 112.5 - 2,000 = \$61,281.25$.

Profit for firm 2 is $(p - AVC) \cdot q - FC = (662.5 - 100) \cdot 75 - 2,000 = \$40,187.50$.

The difference in profits is $61,281.25 - 40,187.50 = \$21,093.75$]

13. ✓ According to scenario 5.1, the two firms collude but they both 'cheat', while they both falsely believe that the other will not cheat. What will the price be?

- A. Around \$100.
- B. Around \$250.
- 90% C. **Around \$500.**
- D. Around \$600.
- E. Around \$800.

[If they both cheat, while they both believe that the other one will produce the collusive quantity (75), they will each produce 112.5. The price will be $p = 1,600 - 5 \cdot (112.5 + 112.5)$ or $p = 475$]

14. ✓ According to scenario 5.1, the two firms collude but they both 'cheat' while they both falsely believe that the other will not cheat. What will the profit for each firm be?

- A. Around \$10,000.
- B. Around \$20,000.
- C. Around \$30,000.
- 86% D. **Around \$40,000.**
- E. Around \$50,000.
- F. Around \$60,000.

[The profit for each firm will be $(p - AVC) \cdot q - FC = (475 - 100) \cdot 112.5 - 2,000 = \$40,187.5$]

15. ✓ According to scenario 5.1, firm 1 believes that both firms will compete in quantities. Firm 2 plans to cheat, while wrongly believes that firm 1 will produce its collusive quantity. What will the price be?

- A. Around \$100.
- B. Around \$250.
- 86% C. **Around \$550.**
- D. Around \$680.
- E. Around \$850.

[Firm 1 will produce 100 units while firm 2 will produce 112.5 units. The price will be $p = 1,600 - 5 \cdot (100 + 112.5)$ or $p = \$537.5$]

16. According to scenario 5.1, firm 1 plans to compete in quantities, while it falsely believes that firm 2 will compete in quantities, too. Firm 2 plans to cheat, while falsely believes that firm 1 will produce its collusive quantity. Which of the following is accurate?

- A. Firm 1 has a higher profit than Cournot and firm 2 has a lower profit than Cournot.
- 15% B. Firm 1 has a lower profit than Cournot and firm 2 has a higher profit than Cournot.
- 74% C. **Both firms have lower profits than Cournot.**
- D. Both firms have higher profits than Cournot.
- E. Both firms have equal profits to Cournot.

[Cournot profit is \$48,000.

Profit for firm 1 is $(p - AVC) \cdot q - FC = (537.5 - 100) \cdot 100 - 2,000 = \$41,750$.

Profit for firm 2 is $(p - AVC) \cdot q - FC = (537.5 - 100) \cdot 112.5 - 2,000 \approx \$47,218$]

17. According to scenario 5.1, which of the following prevents firms from colluding?
- A. Their Cournot profit is lower than their “being cheated upon” profit. [*Cournot profit is \$48,000 while being the profit of the firm who is cheated upon reduces to \$40,187.50*]
 - 69%B. **They cannot legally enforce a cheating agreement.** [*Each firm has a unilateral incentive to cheat because this increases its profit to \$61,281.25. However, if firms could legally enforce the collusive agreement, cheating would not be a problem because the cheater could be penalized for breaching the agreement by more than what cheating would worth to them*]
 - 10%C. Both A and B together.
 - 18%D. None of the above.
18. According to scenario 5.1, if firms compete with respect to price, what would the price be in the market?
- A. Around \$0.
 - 93%B. **Around \$100.**
 - C. Around \$250.
 - D. Around \$550.
 - E. Around \$680.
 - F. Around \$850.
- [*At Bertrand equilibrium firms set $p = MC$*]
19. According to scenario 5.1, if firms compete with respect to price, what would the profit be for each firm?
- A. Around -\$4,000.
 - 50%B. **Around -\$2,000.**
 - 47%C. Zero.
 - D. Around \$2,000.
 - E. Around \$4,000.
 - F. We need more information to answer.
- [*Same as in PC*]
- 20.* According to scenario 5.1, if firms compete with respect to price, which of the following is accurate?
- 11%A. Both firms would exit the market immediately. [*$AVC = p = \$100$, so neither firm has a reason to exit immediately because they cover the AVC*]
 - 22%B. Both firms would exit the market in the long-run. [*With one firm, the market becomes a monopoly. The remaining firm will sell $q = 150$ for $p = \$850$ and make profit $(p - AVC) \cdot q - FC = (850 - 100) \cdot 150 - 2,000 = \$110,500$*]
 - 44%C. Both firms would stay in business in the long run. [*No, because they will be making losses*]
 - 22%D. **Only one firm would exit the market in the long run.**