MICROECONOMICS
Section II
Total Time—1 hour
Reading Period—10 minutes
Writing Period—50 minutes

Directions: You are advised to spend the first 10 minutes reading all of the questions and planning your answers. You will then have 50 minutes to answer all three of the following questions. You may begin writing your responses before the reading period is over. It is suggested that you spend approximately half your time on the first question and divide the remaining time equally between the next two questions. Include correctly labeled diagrams, if useful or required, in explaining your answers. A correctly labeled diagram must have all axes and curves clearly labeled and must show directional changes. Use a pen with black or dark blue ink.

1. As the only gas station in a small town, FillUp has a local monopoly on the sale of gasoline. FillUp is currently earning positive economic profit.

   (a) Draw a correctly labeled graph for FillUp and show each of the following.

      (i) FillUp's profit-maximizing quantity, labeled Q_F

      (ii) FillUp's profit-maximizing price, labeled P_F

      (iii) The deadweight loss associated with FillUp's profit-maximizing quantity, shaded completely

      (iv) The maximum quantity at which FillUp would earn zero economic profit, labeled Q_Z

   (b) Assume that FillUp's fixed costs increase because of a new lease on its property and FillUp stays in business. Will each of the following increase, decrease, or remain unchanged at FillUp's profit-maximizing quantity?

      (i) The deadweight loss. Explain.

      (ii) FillUp's economic profit

   (c) Assume the demand for gasoline decreases because people bike to work more often.

      (i) What must be true for FillUp to continue to operate in the short run?

      (ii) What happens to FillUp's profit-maximizing quantity and price in the short run assuming the firm continues to operate?

2. The following is a table showing Dana's marginal benefit from purchasing bottles of water and good X from a grocery store.

Quantity of Water (in bottles)	Marginal Benefit of Water (in dollars)	Quantity of Good X (in units)	Marginal Benefit of Good X (in dollars)
1	24	1	24
2	18	2	18
3	12	3	12
4	6	4	6
5	3	5	3

(a) What is Dana's total benefit from purchasing 2 bottles of water and 1 unit of good X? Show your work.

(b) Assume the price of a unit of good X is $5. Calculate the total consumer surplus if Dana purchases 3 units of good X. Show your work.

(c) Now assume the price of a bottle of water is $3 and the price of a unit of good X is $6. Dana spends her entire budget of $30 on bottles of water and good X.

  (i) Explain why Dana does not maximize her benefit when she purchases 2 bottles of water and 4 units of good X. Use marginal analysis to explain your answer.

  (ii) What are the optimal quantities of good X and bottles of water at these prices?

  (iii) Suppose the price of a unit of good X drops to $3. Calculate Dana's cross-price elasticity of demand for bottles of water with respect to the price of good X, and state whether the two goods are substitutes or complements. Show your work.
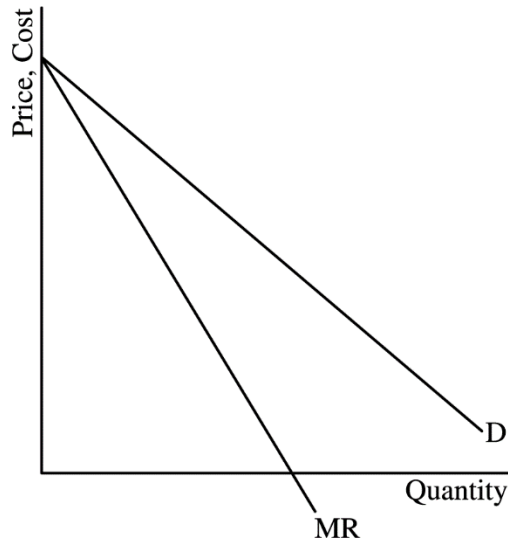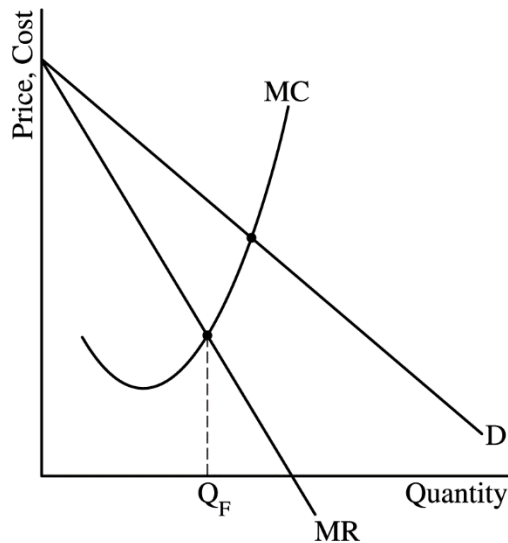
Question 1

9 points (5 + 2 + 2)

(a) 5 points

- One point is earned for drawing a correctly labeled graph of the monopoly showing downward-sloping demand (D) and marginal revenue (MR) curves with the MR curve below the demand curve.
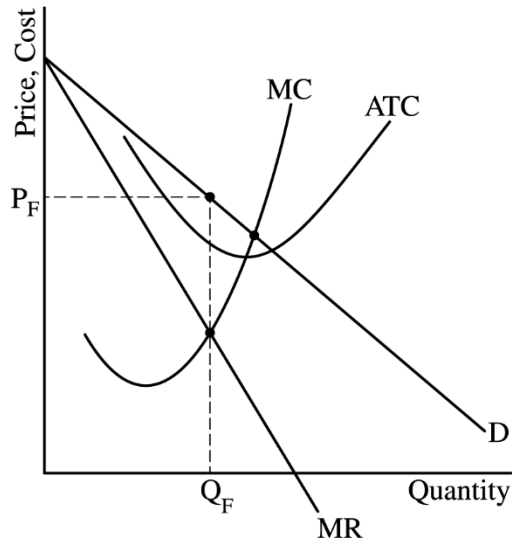

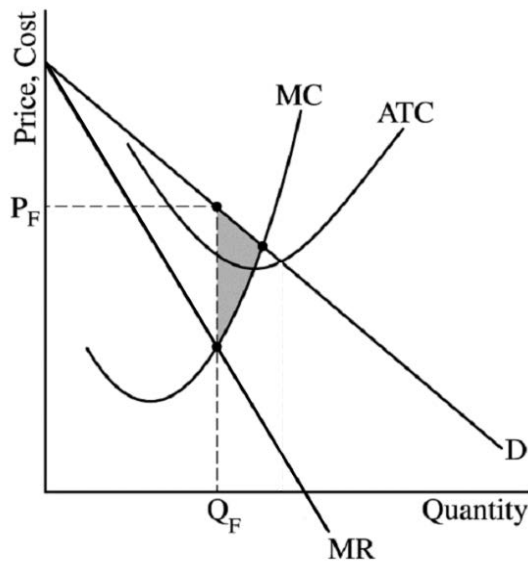- One point is earned for showing the profit-maximizing quantity, labeled Q_F, where MR = MC.

- One point is earned for showing the profit-maximizing price, labeled P_F, from the demand curve at Q_F, and above the average total cost curve (ATC).
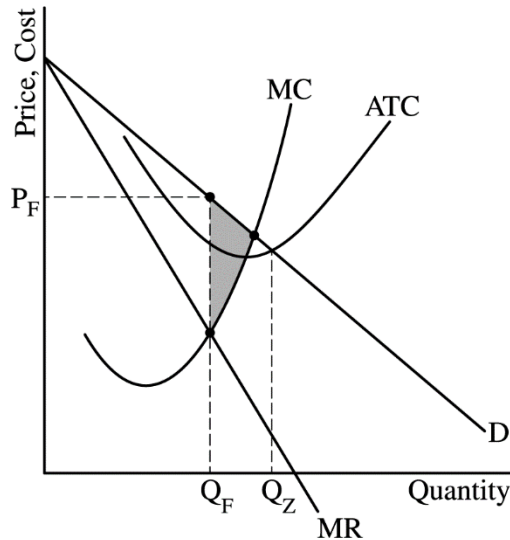

- One point is earned for completely shading the area representing the deadweight loss.

- One point is earned for showing the quantity where economic profits are zero, labeled Q_Z, where ATC intersects the demand curve.

(b) 2 points

- One point is earned for stating the deadweight loss will remain unchanged, and for explaining that changes in fixed costs do not affect MC or do not change the profit-maximizing quantity of the firm.

- One point is earned for stating that FillUp's economic profit will decrease.

(c) 2 points

- One point is earned for stating that the price must be greater than AVC at the profit-maximizing level of output.

- One point is earned for stating that the profit-maximizing quantity and price will both decrease.