1. (4 pts) Define marginal cost.

2. (4 pts) Explain the difference between the short run and the long run.

3. (10 pts) Describe how you would determine if the market for plumbing services is perfectly competitive.

4. (15 pts) Complete all entries in the following table for P = $30

<table>
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<tr>
<th>Q</th>
<th>TR</th>
<th>FC</th>
<th>VC</th>
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</table>
Chapter 7: Efficiency, Exchange, and the Invisible Hand in Action

5. (4 pts) Describe the concept of Pareto efficiency.

6. (4 pts) What is the invisible hand theory?

7. (6 pts) Explain the difference between accounting profit and economic profit. How could a firm earn an accounting profit but suffer an economic loss?

8. (20 pts) The demand for heating oil is \( P = 2 - \frac{Q}{5} \) where price is measured in dollars per gallon and \( Q \) is measured as thousands of gallons per day. The supply of heating oil is \( P = \frac{4}{5} + \frac{Q}{5} \).
   a. Graph demand and supply below and find the equilibrium price and quantity.
   
   b. Calculate and graph consumer surplus, producer surplus, and total economic surplus.
c. If a price ceiling is set at $1.20, how many gallons of heating oil will sell each day?

d. Calculate and graph consumer surplus, producer surplus, and total economic surplus with the price ceiling.

e. Compared to the market, how much economic surplus has been lost due to the price ceiling?
Chapter 8: Monopoly, Oligopoly and Monopolistic Competition


10. (4 pts) Explain what it means for a firm to have market power.

11. (4 pts) How could a monopolist suffer economic losses?

12. (20 pts) Suppose you are a monopolist. Your demand curve is given by \( P = 160 - Q/2 \), and your marginal cost curve is \( MC = Q \). Your fixed costs equal $500.
   a. Graph the demand and marginal cost curve.

   b. Derive and graph (above) the marginal revenue curve.
c. Calculate and indicate on the graph the equilibrium price and quantity.

d. What is your profit?

e. Calculate and graph consumer surplus. How much economic surplus is lost due to the monopoly?

f. Suppose you can perfectly price discriminate by charging each customer their exact reservation price. What quantity will you sell? What would total economic surplus be?

**Bonus**
18. (2 pts) Describe what the optional experiment gla2 demonstrated.

On my honor as an Aggie, I have neither given nor received unauthorized aid on this exam.

Signature __________________________
Chapter 6: Perfectly Competitive Supply

1. (4 pts) Define marginal cost.

Marginal cost is the change in total cost for a small (one unit) increase in output.

2. (4 pts) Explain the difference between the short run and the long run.

Some of the firm’s factors of production are fixed (cannot be changed) in the short run whereas all the firm’s factors of production are variable (can be changed) in the long run.

3. (10 pts) Describe how you would determine if the market for plumbing services is perfectly competitive.

In a perfectly competitive market, there should be many sellers each of which sells a small fraction of the total quantity sold in the market. No individual seller has significant influence on the market price of the product - firms are price takers. All firms sell the same standardized product. Buyers and sellers should be well informed and resources should be mobile so entry is possible.

4. (15 pts) Complete all entries in the following table for P = $30

<table>
<thead>
<tr>
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<th>VC</th>
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<th>AVC=VC/Q</th>
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<td>15</td>
<td>90</td>
<td>3.75</td>
<td>22.5</td>
<td>26.25</td>
</tr>
</tbody>
</table>
Chapter 7: Efficiency, Exchange, and the Invisible Hand in Action

5. (4 pts) Describe the concept of Pareto efficiency.

An outcome is Pareto efficient if there is no way to help some while keeping everyone else no worse off.

6. (4 pts) What is the invisible hand theory?

Invisible hand theory states that the actions of independent, self-interested buyers and sellers usually results in an efficient outcome where all units are sold where someone values them more than costs to produce.

7. (6 pts) Explain the difference between accounting profit and economic profit. How could a firm earn an accounting profit but suffer an economic loss?

An accounting profit is a firm’s total revenue minus explicit costs. Economic profit is total revenue minus total costs, both explicit and implicit, so economic profit is the accounting profit minus implicit costs. A firm has high implicit costs could earn an accounting profit but an economic loss.

8. (20 pts) The demand for heating oil is \( P = 2 - \frac{Q}{5} \) where price is measured in dollars per gallon and \( Q \) is measured as thousands of gallons per day. The supply of heating oil is \( P = \frac{4}{5} + \frac{Q}{5} \).

a. Graph demand and supply below and find the equilibrium price and quantity.

\[
3,000 \text{ gallons/day: } 2 - \frac{Q}{5} = \frac{4}{5} + \frac{Q}{5}, \quad 6/5 = 2Q/5, \quad 6 = 2Q, \quad Q = 3
\]

\$1.40 price: \( P = \frac{4}{5} + \frac{Q}{5} = \frac{4}{5} + \frac{3}{5} = \frac{7}{5} = \$1.40 \)

b. Calculate and graph consumer surplus, producer surplus, and total economic surplus.

Consumer surplus \( CS = (2 - 1.4) \times \frac{3}{2} = 0.9 \)

Producer surplus \( PS = (1.4 - 0.8) \times \frac{3}{2} = 0.9 \)

Total economic surplus = \( CS + PS = 1.8 \)

c. If a price ceiling is set at $1.20, how many gallons of heating oil will sell each day?
2,000 gallons will sell each day: $1.2 = \frac{4}{5} + \frac{Q}{5}$, $0.4 = \frac{Q}{5}$, $Q = 2$

d. Calculate and graph consumer surplus, producer surplus, and total economic surplus with the price ceiling.

Consumer surplus $CS = (2 - 1.6) \frac{2}{2} + (1.6 - 1.2) \frac{2}{2} = 1.2$
Producer surplus $PS = (1.2 - 0.8) \frac{2}{2} = 0.4$
Total economic surplus $= CS + PS = 1.6$

e. Compared to the market, how much economic surplus has been lost due to the price ceiling?

$1.8 - 1.4 = 0.4$

SEE GRAPH

Chapter 8: Monopoly, Oligopoly and Monopolistic Competition

An oligopoly is an industry in which a few firms produce similar items.

10. (4 pts) Explain what it means for a firm to have market power.

A firm has market power when it has the ability to raise the price of its product without losing all its sales.

11. (4 pts) How could a monopolist suffer economic losses?

A monopolist could suffer economic losses if it has high fixed costs. If the price charged for the quantity where marginal cost equals marginal revenue ($MC = MR$) does not cover average total costs, a monopoly will lose money.

12. (20 pts) Suppose you are a monopolist. Your demand curve is given by $P = 160 - \frac{Q}{2}$, and your marginal cost curve is $MC = Q$. Your fixed costs equal $500.

a. Graph the demand and marginal cost curve.

SEE GRAPH
b. Derive and graph (above) the marginal revenue curve.

Marginal revenue: \( MR = 160 - Q \)

c. Calculate and indicate on the graph the equilibrium price and quantity.

Equilibrium quantity is 80: \( MR = MC, \ 160 - Q = Q, \ 160 = 2Q, \ Q = 80 \)
Equilibrium price is 120: \( P = 160 - Q/2 = 160 - 80/2 = 160 - 40 = 120 \)

d. What is your profit?

Average total cost \( ATC = AFC + AVC = 500/80 + 80/2 = 6.25 + 40 = 46.25 \)
Profit \( (P - ATC) Q = (120 - 46.25) 80 = (73.75) 80 = 5,900 \)

e. Calculate and graph consumer surplus. How much economic surplus is lost due to the monopoly?

Consumer surplus \( CS = (160 - 120) 80 = 3,200 \)

\( P = MC, \ 160 - Q/2 = Q, \ 160 = 3Q/2, \ 320 = 3Q, \ Q = 106.67 \)
Economic surplus lost \( (120 - 80) 26.67 = 1,066.8 \)

f. Suppose you can perfectly price discriminate by charging each customer their exact reservation price. What quantity will you sell? What would total economic surplus be?

Quantity 106.67: \( P = MC, \ 160 - Q/2 = Q, \ 160 = 3Q/2, \ 320 = 3Q, \ Q = 106.67 \)
Total economic surplus \( (160 - 0) 106.67/2 = 4,266.8 \)

**Bonus**

18. (2 pts) Describe what the optional experiment gla2 demonstrated.

The experiment demonstrated how a monopolist picks quantity to maximize profit.