1. (20 points) Let us suppose there is only one place to buy gasoline in Frostbite Falls, Minnesota. The demand for gasoline is given below.

<table>
<thead>
<tr>
<th>Price</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>$20</td>
<td>0</td>
</tr>
<tr>
<td>$18</td>
<td>1</td>
</tr>
<tr>
<td>$16</td>
<td>2</td>
</tr>
<tr>
<td>$14</td>
<td>3</td>
</tr>
<tr>
<td>$12</td>
<td>4</td>
</tr>
<tr>
<td>$10</td>
<td>5</td>
</tr>
</tbody>
</table>

They must pay $3 rent on their building and the only other cost they have is buying their gasoline. The supplier has set up a contract where the cost structure is $10 per unit.

a) In the graph to the right, please place their demand, marginal cost and marginal revenue curves. Label and number the axes!

b) What price would this profit-maximizing monopolist charge?

\[ \frac{14}{16} \] (or \( \frac{14}{16} \))

c) What quantity would they bring to market?

3 (or 2)

d) How much profit would they make?

\[ \text{TR} = 3 \times 14 = 42 \]
\[ \text{MC} = \frac{14}{16} + 3 \times 10 = 3 + 30 = 33 \]
\[ \text{Profit} = 42 - 33 = 9 \]

e) Suppose that the monopolist was broken up and the resulting firms could produce as cheaply as the monopolist. In the graph, show the deadweight loss from a monopoly.

f) In your own words, explain what the deadweight loss tells us.

This is the lost surplus (consumer surplus plus producer surplus) due to a monopoly. People will pay more than the cost but not get the product.
2. (22 points) Santiago is a fisherman. He is one of many fishermen catching fish.
a. What type of industry is this? (Circle one.)
   a. perfect competition
   b. monopoly
   c. differentiated oligopoly
   d. homogeneous oligopoly
   e. monopolistic competition.

b. Explain your answer in part (a), using at least three of the characteristics that define a market.

   It is clear that there are
   (1) many sellers
   (2) many buyers
   (3) no barriers to
   entry, (4) I would argue, though, that
   any type of fish is the same
   if caught by different fishermen, so
   (4) homogeneous and (5) price taken.

c. Suppose the price of fish is $100 per box. Fill in all of the blanks in the table below.

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Marginal Cost</th>
<th>Variable Cost</th>
<th>Fixed Cost</th>
<th>Total Cost</th>
<th>Average Total Cost</th>
<th>Total Revenue</th>
<th>Marginal Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>...</td>
<td>0</td>
<td>50</td>
<td>50</td>
<td>-</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>1</td>
<td>60</td>
<td>60</td>
<td>50</td>
<td>110</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>80</td>
<td>140</td>
<td>50</td>
<td>190</td>
<td>95</td>
<td>200</td>
<td>100</td>
</tr>
<tr>
<td>3</td>
<td>100</td>
<td>240</td>
<td>50</td>
<td>290</td>
<td>96.7</td>
<td>300</td>
<td>100</td>
</tr>
</tbody>
</table>

d) What quantity should Santiago bring to market?

   \[ \frac{MC}{P} = Q \]

   \[ Q = 2 \] (Accept) \[ Q = 3 \] (2 accepted)

e) What will his profit be at that quantity?

   \[ T = TR - TC = 10 \]
3. (10 points) Suppose we see the supply and demand for tuna in the tables below.

<table>
<thead>
<tr>
<th>Price</th>
<th>Quantity</th>
<th>Price</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>0</td>
<td>12</td>
<td>24</td>
</tr>
<tr>
<td>10</td>
<td>4</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>8</td>
<td>8</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td>6</td>
<td>12</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>4</td>
<td>16</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>20</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>0</td>
<td>24</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

a) In the graph below, carefully graph the supply and demand curves. **Number and Label the axes**

b) Suppose the government issues an order that tuna can only be sold at a price of $4. Please show the consumer surplus on the graph. **Area below Demand curve and above $4**

c) Keeping this price of $4, show the producer surplus. **Area above supply curve and below $4**

d) What would happen to the (total) surplus if we allowed the price to be at the market clearing equilibrium? **Explain why.**

4. (Extra Credit. Two points if answered correctly AND attendance guidelines are met.) I discussed several factors that determine the elasticity of demand for labor. Cite one that will make the demand for labor elastic (responsive.)
5. (14 points) a. There are five characteristics that define a market. Explain what is meant by monopolistic competition. Use at least three of the five characteristics in your discussion. Monopolistic competition is a type of market with many firms selling a differentiated product. The defining characteristics are:
- Many sellers
- Many buyers
- Some ability to set price
- Differentiated product
- No barriers to entry

b. Give an example of an actual firm that is a monopolistically competitive firm. If I am not familiar with the firm, describe it to me.
   - Brown Toy restaurant
   - Red Starbucks Coffee
   - Boston Gelato ice cream

c. Given the diagram below, what quantity will the firm bring to market?

![Diagram of cost and revenue curves]

- Operate at $Q$ where $MC = AC$
- $200 \leq 210 \leq 50$

- What price will they charge?

- Look at Demand curve: $P \approx 26$

- Are they making a profit? How can you tell?

- Yes $P > ATC$

- In the long run, what happens to their level of profit? Explain why.

- Other firms will enter. It will fall
6. (10 points) Suppose that labor is the only input used by a perfectly competitive firm. The firm’s production function is as follows:

<table>
<thead>
<tr>
<th># of Workers</th>
<th>Units of Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>13</td>
</tr>
<tr>
<td>3</td>
<td>19</td>
</tr>
<tr>
<td>4</td>
<td>25</td>
</tr>
<tr>
<td>5</td>
<td>28</td>
</tr>
</tbody>
</table>

(a) Calculate the marginal product for each additional worker.

(b) Each unit of output sells for $10. Calculate the value of the marginal product of each worker.

(c) Graph the firm’s demand curve for labor. Carefully label the axes.
Multiple Choice/Short Answer – 2 points each.

7. Which property defines the situation when an increase in the number of workers causes all workers to become less productive?
   a. diminishing profitability
   b. diminishing marginal product
   c. increasing marginal product
   d. diminishing marginal cost
   
8. Which of the following could decrease labor demand?
   a. an increase in migrant workers
   b. a decrease in demand for the final product produced by labor
   c. an increase in the labor supply
   d. an increase in the marginal productivity of workers

9. If firms in a monopolistically competitive market are incurring economic losses, which of the following scenarios would best reflect the change facing incumbent firms (who are able to stay in the market) as the market adjusts to its new equilibrium?
   a. a downward shift in their marginal cost curve
   b. an upward shift in their marginal cost curve
   c. an increase in demand
   d. a decrease in demand

10. A firm in a monopolistically competitive market operates on the rising portion of its average total cost curve.
    a. declining portion of its average total cost curve.
    b. rising portion of its demand curve.
    c. rising portion of its supply curve.

11. When firms sell highly differentiated consumer goods it is likely that one significant cost to all firms is
    a. taxes.
    b. advertising.
    c. fixed costs.
    d. intermediate materials.

12. In markets characterized by oligopoly,
    a. collusive agreements will always prevail.
    b. collective profits are lower under cartel arrangements.
    c. pursuit of self-interest by profit maximizing firms always maximizes collective profits in the market.
    d. there is tension between cooperation and self-interest.
13. The legislation passed by Congress in 1890 to reduce the market power of large and powerful "trusts" is called
   a. the Sherman Act.
   b. the Clayton Act.
   c. the 14th Amendment.
   d. none of the above

14. When a monopolist is able to sell its product at different prices, it is engaging in
   a. quality adjusted pricing.
   b. distribution pricing.
   c. price discrimination.
   d. price differentiation.

15. An example of an explicit cost of production would be
   a. the cost of forgone labor earnings for an entrepreneur.
   b. the cost of flour for a baker.
   c. the lost opportunity to invest in other capital markets when the money is invested in one's business.
   d. none of the above.

   **Short answer.**

16. Median family income in the United States is approximately $46,000 dollars.

17. Cite one flaw of the current poverty measure.

18. What percentage of Americans are poor?

   12.6%