1. You have been hired as a consultant by the Whataburger Corporation. They give you the following information and want you to help them with some pricing decisions.
   - They determined that the price elasticity of demand for Whataburgers is 0.45. Your boss asks you to give her an estimate of the change in the number of burgers they will sell if they increase their price by 20%. What will you tell her? Be as specific as possible.
   - Your boss also wants to know if this increase in price will lead to an increase, decrease or no change in revenue. What will you tell her? Be as specific as possible. Briefly explain.
   - You find that when the price of onion rings goes up 20% the number of Whataburgers sold decreases by 40%. Using this information, what elasticity can you determine? Determine that elasticity. Show your work for full credit. What does this tell you about the relationship between onion rings and Whataburgers? Briefly explain.
   - Last year the income in Georgetown increased by 15% and the number of Whataburgers sold fell by 45%. Using this information, what elasticity can you determine? Determine that elasticity. Show your work for full credit. What does this tell you about Whataburgers? Briefly explain.

2. During the second Gulf War the supply of oil was reduced. Before the war, the price of oil was $20 per barrel and 10,000 barrels were traded on the world market. During the war the price was $50 and only 4,000 barrels were traded.
   - Given the above, you can determine either the price elasticity of supply or the price elasticity of demand. Which elasticity can you determine? [A graph might help.]

3. A consumer has a choice between two unrelated goods, chocolate (C) and peanut butter (PB). The price of chocolate is $4.00 per unit and the price of peanut butter is $1.00 unit. The consumer has $12.00 to spend on the two goods.

   You know the following information about the marginal utility derived from the two goods.

<table>
<thead>
<tr>
<th>UNITS</th>
<th>MU(C)</th>
<th>MU(PB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

   Determine the utility maximizing level of consumption of the two goods.

   Discuss how you found the utility maximizing quantities of the two goods. In general what condition must be met for utility maximization. Explain the intuition behind this condition.

4. Consider a consumer with $2,000 to spend on two goods, Jam and Coffee. You know the following about prices, \( P_{Jam} = $5/jar \), \( P_{Coffee} = $10/unit \). Currently you are consuming 100 jars of jam and you are spending all of your income on the two goods.

   At this level of consumption the \( MU(Jam) = 25 \) and the \( MU(Coffee) = 50 \). Given this information are you maximizing your utility? Explain. If not, how could you alter your consumption of the two goods to increase your utility?
5. The government is thinking of placing a per unit tax on either the production of insulin or Pizza Hut Pizzas. The producers of insulin do not seem very worried about this possible tax. While the producers of Pizza Hut Pizza seem very concerned. Explain why this would be true using graphs of the market for insulin and the market for Pizza Hut Pizzas.

6. Consider the market for video tape rentals (V). Show this market graphically. Label both axes and the two lines. Label the equilibrium price and quantity, \( P_0 \) and \( Q_0 \), respectively. Assume \( P_0 = $4.50 \).
   A. The government has decided to tax the consumption of this good. They place a per unit tax of $2 per video rented. Show the effects of this tax on the market for video tape rentals. Label the new equilibrium quantity \( Q_1 \). Label the price to consumers, \( P_C \), and the price to producers, \( P_P \).
   B. Is there any revenue generated from this tax? If yes, label the corners of the area describing the revenue from the tax (a,b,c,d).
   C. Are consumers hurt by this tax? If yes, label the corners of the area describing the loss in consumer surplus (j,k,l,m).
   D. Are producers hurt by this tax? If yes, label the corners of the area describing the loss in producer surplus (w,x,y,z).
   E. Is there a deadweight loss from this tax? If yes, shade in an area that shows the deadweight loss from this tax.

7. Draw a correctly labeled graph of a LRAC curve which displays increasing returns to scale (economies of scale), constant returns to scale and decreasing returns to scale (diseconomies of scale). Indicate what sections of your LRAC curve displays which returns to scale.
   - Why do we only look at LRAC not LR Variable Costs or LR Fixed Costs? Explain

8. Assume you are running a firm producing trail mix. The trail mix industry is a perfectly competitive industry. The price of inputs associated with the production of trail mix will not change as industry output increases or decreases. Your goal is to maximize profits. You know the following cost information. Assume MC is always increasing in this range.

<table>
<thead>
<tr>
<th>lbs. of trail mix</th>
<th>MC</th>
<th>AVC</th>
<th>ATC</th>
</tr>
</thead>
<tbody>
<tr>
<td>250</td>
<td>3.41</td>
<td>4.10</td>
<td>7.18</td>
</tr>
<tr>
<td>360</td>
<td>4.65</td>
<td>4.27</td>
<td>6.41</td>
</tr>
<tr>
<td>440</td>
<td>6.40</td>
<td>4.65</td>
<td>6.40</td>
</tr>
<tr>
<td>500</td>
<td>8.53</td>
<td>5.12</td>
<td>6.66</td>
</tr>
<tr>
<td>540</td>
<td>12.80</td>
<td>5.69</td>
<td>7.11</td>
</tr>
<tr>
<td>550</td>
<td>51.20</td>
<td>6.52</td>
<td>7.92</td>
</tr>
</tbody>
</table>

A. If the current price of trail mix is $4.75, how many pounds of trail mix will you produce? What is your profit or loss?
B. If the trail mix increases to $9, how many pounds of trail mix will you produce? What is your profit or loss?
C. In long run equilibrium you and 4,999 other identical firms are supplying trail mix. What is the long-run equilibrium price for trail mix? How much trail mix does your firm produce? What is the industry's output?
9. Assume a perfectly competitive industry is initially in LR equilibrium.
A. What does this imply about the relationship between ATC, P and MC? Show this graphically. If the market demand for this good increases, what happens to the demand curve facing the individual firm? Show this. What is the level of output of the firm in the short-run relative to the original long-run level of output?
B. What are economics profits in the short-run? How would other firms respond to the positive profits in this industry?
C. Determine the level of output for the firm in the new LR equilibrium vs. the original LR equilibrium (assume costs do not change as output in the industry increases). What has happened to the price of the good?

10. You are offered $100,000 to become an economics professor. Instead you take $70,000 out of the bank, which was earning 20%, to start your own business, a cookie company. To decide whether to open this business you hire an accountant. The accountant estimates that the annual cost of your business will be:

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dough</td>
<td>$30,000</td>
</tr>
<tr>
<td>Labor</td>
<td>$50,000</td>
</tr>
<tr>
<td>Rent</td>
<td>$10,000</td>
</tr>
<tr>
<td>Advertising</td>
<td>$10,000</td>
</tr>
</tbody>
</table>

The revenue from your cookies are an estimated $180,000.

- Determine the profits the accountant would say you would make.
- Determine the profits according to an economics.
- Would you want to open this business if all you were worried about were profits? Explain.

11. Show in a properly labeled graph the MC, AVC, and ATC curves in the short-run. Given a level of output, Q’, show graphically the total cost the total variable cost and fixed cost for this firm. If you drew your AVC and ATC curves correctly they will come together as output increases. Why? Why does MC fall and then start to increase? Explain using an equation describing MC as a function of the MP of labor and the wage.

12. Briefly discuss the difference between the short-run and long-run decisions a firm makes.

13. What are the three possible economies of scale? Describe each. What might cause each of the economies of scale to exist? Explain.

14. Consider a country that is an importer of Tea. Show a properly labeled graph of the domestic market for Tea. Add the world price (P^W). Show the level of domestic production, domestic consumption, and the level of imports. Show the gains from trade.
   A. Assume the government imposes a tariff on the importation of Tea. Let the per unit tariff = t and P^W + t < the autarky price. Show the effects of this tariff in the domestic market for Tea. Label the new level of imports Q^IMP.
   B. Show the loss in consumer surplus. Clearly indicate where this surplus goes.
   C. How would things be different had the government imposed a quota = Q^IMP? Explain.

15. Using the tea example, show the effects of a per-unit tariff of $2 on tea. Be sure to show the tax collected, the deadweight loss and the gain or loss to producers and consumers. Assume with the tariff, imports are now 1,000 tons of tea.
16. Instead of the tariff described in the previous question, show the effects of a quota set at 1,000 tons of tea. Be sure to show the foreign producer surplus, the deadweight loss and the gain or loss to producers and consumers relative to free trade.

17. Why might the U.S. prefer the tariff over the quota? Who might prefer the quota. Explain using your graphs from the previous questions.

18. Give the arguments used to justify trade restrictions.

19. Why is the MR curve for the monopolist below the demand curve? Would a monopolist ever produce on the inelastic portion of a demand curve? Explain.

20. In a properly labeled graph show the D, MR, MC and ATC curves for a monopoly. Show the monopolist making positive economic profits. Discuss this equilibrium in comparison to the perfectly competitive equilibrium. What are some of the desirable properties of the Perfectly Competitive equilibrium that do not exits under monopolies?

21. A. On a correctly labeled graph, show an unregulated natural monopolist making positive profits. Be sure to include the ATC, MC, D and MR curves for the monopolist. Show the price the monopolist charges, the level of output and the area which represents profit to the monopolist.
   B. Let’s assume the government now regulates the monopolist. They want to make sure the monopolist produces at the efficient level of output. On your graph above show the price and quantity associated with the efficient allocation. Call these P_e and Q_e. Why will this type of regulation not work? Be brief.
   C. If instead we use rate of return regulation, determine the price and quantity combination the regulators would be hoping to achieve. Call these, P_{REG} and Q_{REG}. Is this an efficient allocation? Explain.