Question 1-5: Worth 10 points each for a total of 40 points. **ONLY ANSWER 4!** If you answer 5 and do not identify which one you would like me to grade, I will grade the first 4.

1. a. Using the graph, analyze the effect a $300 price ceiling would have on the market for gum-ball machines. What is the quantity sold? Would this be a binding or non-binding price ceiling? Surplus, shortage, or nothing? If a surplus or shortage does in fact exist, calculate the shortage or surplus?

b. Using the graph shown, analyze the effect a $700 price ceiling would have on this market. What is the quantity sold? Would this be a binding or non-binding price ceiling? Surplus, shortage, or nothing? If surplus or shortage does in fact exist, calculate the shortage or surplus?

c. What is the purpose of policymakers to impose a price ceiling or price floor?

d. Suppose a government employee realizes a mistake about the elasticity of the demand curve for gum-ball machines. Instead of a 45-degree angle, the employee discovers the demand curve is perfectly inelastic. Will this change your answer in part a.? (Hint: Demand curve rotates around focal point)

\[ Q_s = 3,000 \]

Why? Market would like to operate at price $500 & Quantity 5,000

but the max price is set at $300

\( P_c = 7,000 \) & \( Q_s = 3,000 \)

\[ 7,000 - 3,000 = 4,000 \text{ shortage} \]

b) $700 price ceiling is above the market equilibrium. As a result, the price ceiling is not imposed. Thus, the market will operate at mkt equil, which is \( P = 500 \) & \( Q = 5,000 \).

There is no binding price ceiling (non-binding). If non-binding there can be no shortage or surplus.

c) Often this is done in an attempt to increase equity or protectionism.

d) See above
2. Larry the graduate student can read 100 pages of economics in an hour (Don’t I wish). He can also read 5 pages of philosophy in an hour. He spends 4 hours per day studying.
   a. Draw Larry’s production possibilities frontier for reading economics and philosophy.
   b. What is Larry’s opportunity cost of reading 20 pages of philosophy in terms of reading economics?
   c. Explain, in words, the difference between a linear production possibility frontier and a bowed-out production possibility frontier.
   d. Is it possible for Larry to extend beyond his production possibility frontier? If so, explain and if not, discuss why not.

\[
\begin{align*}
\text{b.) 20 pages of phil} & \left( \frac{1 \text{ hr.}}{5 \text{ page of phil}} \right) \left( \frac{100 \text{ pages of econ}}{1 \text{ hr.}} \right) = 400 \\
\text{c.) Linear production possibility frontier:} & \quad \text{resources perfectly shiftable, costless, bowed out! increased opportunity cost, one good to the other.}
\end{align*}
\]

\[
\text{d.) Yes, it is possible. You can trade w/ another student who can read philosophy faster and who happens to be taking an Econ class.}
\]
3. A local newspaper in New York reported that subway ridership declined after a tax increase: "There was a 4.3% decrease in ridership in the month of December 1995, the first full month after the price increase of 25%.

a. Use these data to calculate the price elasticity of demand for subway rides. Elastic or inelastic?

b. Using a graph, explain how this tax will influence the supply-demand of subway ridership in New York? Would it matter if the demand curve is inelastic or elastic? Explain...

c. Why might your estimate of the elasticity be unreliable?

d) This is only a one month measurement

Consumers may substitute or cut back due long run.
4. Are the following statements true or false? Also, explain why the statements are true or false.
   a. "The burden of a tax is divided between buyers and sellers depending on the elasticity of demand and supply." (Hint: Use a graph to explain why this is true or not true.)
   b. "Coke, pizza, and insulin are all elastic goods."
   c. "It is not possible to have elastic and inelastic properties along a single demand curve."
   d. "If the demand curve can be represented by $Q_d = 20 - P$ and the supply curve by $Q_s = 5 + 2P$. The equilibrium price is $10$ and the equilibrium quantity is $20.""

a) True:

b) False: Why? Coke & pizza elastic with many substitutes

Insulin is inelastic, not many substitutes.

c) True: A single demand curve can have elastic and inelastic properties.

d) False: At equilibrium, $Q_s = Q_d$. Thus, set them equal & solve for $P$.

Plug price back in equation: $20 - P = Q$; $15 = 3P$

$P = 5$

ER = just plug in $P = 10$: $E = 20$, equation will not be satisfied.
5. Congress and the president decide that the United States should reduce air pollution by reducing its use of gasoline. They impose a $0.50 tax for each gallon of gasoline sold.
   a. Should they impose this tax on producers or consumers? Explain carefully using a supply-and-demand diagram.
   b. If the demand for gasoline were more elastic, would this tax be more effective or less effective in reducing the quantity of gasoline consumption? Explain with both words and a diagram.
   c. Are consumers of gasoline helped or hurt by this tax? Why?
   d. Are workers in the oil industry helped or hurt by this tax? Why?

(b) If more elastic, tax will be more effective in reducing gasoline consumption.

c. Consumers hurt by tax b/c they are getting less for a higher price.

d. Workers in oil industry hurt as well, with lower quantity sold & being produced, some workers may lose their jobs.
3. Congress and the president decide that the United States should reduce air pollution by reducing its use of gasoline. They impose a $0.50 tax for each gallon of gasoline sold.
   a. Should they impose this tax on producers or consumers? Explain carefully using a supply-and-demand diagram (Assume the demand curve is at a 45-degree angle).
   b. If the demand for gasoline were more elastic than the supply, who bears the tax burden (buyers, sellers, neither, or both)? Explain with both words and a diagram.
   c. Is it possible to increase taxes on a good and decrease tax revenue? Explain why or why not (Hint: Diagram may help you).

b.)

\[ \text{move \& decrease} \]

- If demand more elastic, tax burden increases for producer. If demand were inelastic, then consumers would be more affected since they are not responsive to price changes. Bigger \( \downarrow \) in quantity.

\[ \text{As taxes increase from } T_1 \text{ to } T_2, \text{ the tax revenue will decrease. Essentially, there is a maximum amount of tax revenue before increasing taxes may in fact decrease total tax revenue.} \]