1) Taxes. In all cases, identify the original equilibrium price quantity pair, the price paid by consumers, the price received by producers, the size of the tax revenue, and the quantity supplied-demanded when the tax is imposed.

   a. Illustrate on a graph the impact of a specific tax placed on producers.

   b. Illustrate on a graph the impact of an ad valorem tax placed on consumers.

   c. Explain the concept of consumer incidence using the graph you drew for (b).

\[ CI = \frac{\Delta P}{\Delta P} \text{ consumer pays} \]
\[ CI = \frac{P^c - P^*}{P^c} = \frac{P^c - P^*}{\Delta P} \text{ consumer pays} \]

In words, CI refers to the share of the tax burden that consumers bear. It is expressed as the increase in the price per unit consumers pay after tax to the price per unit they pay before tax, divided by the change in the tax per unit.
d. In what cases can a supplier pass along the entire specific tax to the consumer?

- When the demand is perfectly inelastic

- When the supply is perfectly elastic

2) Illustrate how a specific tax on consumers can be used to regulate a market where a negative externality is generated to arrive at the socially optimal price – quantity pair.

- First, find the socially optimal Q, (Q^so)
- Then, find the point where the Q^so on the MC^e line (A)
- Draw a Demand curve parallel to the original Demand curve passing through A.
3) Your friends Green Gary and Fox-Fan Frieda are arguing again. Today, they are arguing about whether the government should or should not increase the specific tax on gasoline in the US. They have asked you, the expert economist, to help settle their argument. You remember from class discussion that the own price elasticity of demand for gasoline is inelastic both in the short run and the long run. Assume that the price elasticity of supply for gas is unit elastic in your response.

a. Green Gary argues that the US uses too much gasoline and this has a negative environmental impact. He supports the idea of a specific tax on suppliers. He predicts that placing a specific tax on suppliers will bring about a smaller percentage change in the price consumers pay than the percentage change in quantity demanded. Is he right? Why or why not.

Green Gary thinks \[ \frac{\% \Delta Q}{\% \Delta P} < 1 \] (smaller percent change in price than in quantity demanded)
We know that demand is inelastic. \( (|\epsilon| = \frac{\% \Delta Q}{\% \Delta P} < 1, \frac{% \Delta Q}{\% \Delta P} < 1%) \)
The quantity demanded will not change much even if the price varies a lot. So, he is wrong. (you can show the equation or state in words.)

b. Fox-Fan Frieda says that Green Gary’s specific tax will place a massive burden on the strategically important gasoline production industry and this will threaten our national security. She argues that the specific tax should be placed on consumers, since this will reduce the burden of the tax on this critically important industry and divert the burden to the consumers who are less critical to our national security (!!!). Is she right? Why or why not.

Fox-Fan Frieda’s argument is that putting the tax on supplier or consumer will result in different tax burden on supplier and consumer. However, the outcome of the tax will be the same whether you put the tax on supplier or consumer.

[Diagram of demand and supply with tax]
4) Illustrate on a supply and demand graph the impact of a:
   a. A demand side specific tax.

   ![Supply and Demand Graph A](image)

   b. A demand side tax expenditure subsidy.

   ![Supply and Demand Graph B](image)