1. Perloff (fourth edition): question 5 page 70
   When Viagra was introduced, the demand curve for seal genitalia moved to the left (from $D_1$ to $D_2$ in Figure 1), resulting in a lower demand and price. If the original supply curve is $S_2$, then under demand curve $D_2$, zero will be sold on the market even if there is a positive demand at various prices.

![Figure 1](image)

2. Perloff (fourth edition): question 11 page 71
   As an example, the demand for cigarettes is inelastic. As noted in the text, price increases due to taxes are substantial, yet consumers continue to purchase cigarettes in large quantities. Although fewer cigarettes are purchased as the price increases, an elasticity in the range of $-0.5$ indicates that a tax that raises prices by 10% will only reduce smoking by about 5%. The addictive nature of nicotine and lack of available substitutes contribute greatly to this inelasticity. Luxury boats are an example of a good with elastic supply. When the luxury tax of 1990 increased the prices of expensive boats, demand for these boats plummeted. Suppliers were unable to reduce prices and continue to sell profitably. Thus, they suffered an enormous loss of sales and jobs. If supply had instead been highly inelastic, nearly the same quantity of boats would have been sold, and suppliers would simply have paid most or all of the tax.

3. Perloff (fourth edition): question 13 page 71
   If demand is perfectly inelastic, the demand curve is vertical. The supply curve shifts up by $\$1$, and all of the incidence falls on consumers. Price increases by $\$1$, and there is no change in quantity.
4. Perloff (fourth edition): question 14 page 71

This is the opposite case as in question #13. The demand curve is horizontal when perfectly elastic. The supply curve shifts up by $1. Price paid by consumers remains at \( p \) (the pre-tax level). Price received by sellers is \( p - \tau \) (the price less the tax). Quantity falls to the intersection of the new supply curve and the original demand curve. Suppliers absorb the entire burden of the tax because consumers have no willingness to pay higher prices.

5. Perloff (fourth edition): problem 35 page 73

Given the initial market demand and supply functions, the equilibrium price and quantity are \( Q = 20, \ p = 80 \). With the tax, the supply curve becomes \( p = 20 + 4Q \), or \( Q = -5 + 0.25p \). The new price and quantity are \( Q = 16, \ p = 84 \). Consumers pay 0.2 of the tax, and producers receive 64. The revenue from the tax could be used to fund work crews to clean up the bottle litter. See Figure 2.

![Figure 2](image)


Begin by creating the elasticities based on \( (dp/dQ)(p/Q) \), so \( \varepsilon = -1/b(p/Q) \) and \( \eta = 1/d(p/Q) \). Then substitute into the formula for tax based on the elasticity ratio.

\[
\eta/((\eta - \varepsilon) = (1/d)/(1/d + 1/b) \ (pQ) = b/(b + d)
\]

7. Using the formula of elasticity, if the equation for the demand for cups is \( Q = 300 - 100p \), what is the elasticity of demand when \( p = $1 \)? and when \( p = $2 \)?

If \( Q = 300 - 100p \), \( Q'(p) = -100 \), and thus \( \varepsilon = \frac{p}{q}Q'(p) = (-100) \frac{p}{300 - 100p} \). For \( p = $1 \), \( \varepsilon = (-100) \frac{1}{300 - 100} = -\frac{1}{2} \). For \( p = $2 \), \( \varepsilon = (-10) \frac{2}{300 - 200} = -2 \).