11. Suppose the demand curve for a product is given by $Q=10-2P+P_s$, where P is the price of the product and P_s is the price of a substitute good. The price of the substitute good is $2.00.

a.   Suppose P=$1.00. What is the price elasticity of demand? What is the cross-price elasticity of demand?

First you need to find the quantity demanded at the price of $1.00. $Q=10-2(1)+2=10$.   Price   elasticity   of   demand   =

$$\frac{P}{Q}\frac{\Delta Q}{\Delta P} = \frac{1}{10}(-2) = -\frac{2}{10} = -0.2.$$

Cross-price elasticity of demand $= \frac{P_s}{Q}\frac{\Delta Q}{\Delta P_s} = \frac{2}{10}(1) = 0.2.$

b.   Suppose the price of the good, P, goes to $2.00. Now what is the price elasticity of demand? What is the cross-price elasticity of demand?

First you need to find the quantity demanded at the price of $2.00. $Q=10-2(2)+2=8$.

Price elasticity of demand $= \frac{P}{Q}\frac{\Delta Q}{\Delta P} = \frac{2}{8}(-2) = -\frac{4}{8} = -0.5.$

Cross-price elasticity of demand $= \frac{P_s}{Q}\frac{\Delta Q}{\Delta P_s} = \frac{2}{8}(1) = 0.25.$