

Name _____

Quiz # 5

Suppose that the demand for a product is given by $Q = 100 - 2P$ and the supply by $Q = -75 + 5P$.

a. What are the equilibrium price and quantity in this market?

$$100 - 2P = -75 + 5P \Rightarrow P = 25, Q = 50$$

b. For a linear demand or supply curve, the elasticity at any point, P^*, Q^* can be calculated at $e = \frac{\partial Q}{\partial P} \cdot \frac{P^*}{Q^*}$. Use this fact to compute the elasticity of supply and demand for these curves at the equilibrium point.

$$e_D = -2\left(\frac{25}{50}\right) = -1 \quad e_S = +5\left(\frac{25}{50}\right) = +2.5$$

c. Suppose the supply curve in this problem shifted to $Q = -82 + 5P$. Show how the elasticities in part b can be used to estimate the percentage increase in price in this case. (Hint 1: What is the percentage reduction in quantity supplied at the initial equilibrium? Hint 2: You can check whether your final answer is right by re-computing the equilibrium price using the new supply curve – you must deal with the elasticities to answer the question, however)

Supply falls by 7. This is 14% of the initial equilibrium of 50. There is an excess demand of 14% at the initial equilibrium price. To compensate, price must rise. Each 1% rise in price yields a 1% fall in demand and a 2.5% rise in supply. Hence excess demand is reduced by 3.5% by the price rise. To get a 14% reduction requires a price rise of 4%. That means price must rise from 25 to 26.

d. Returning to the supply-demand equilibrium from part a, suppose the government instituted a tax of 3.5 per unit on this item. What would the new equilibrium in this market be?

Let P be the price received by suppliers. Hence, demanders pay $P + 3.5$

$$100 - 2(P + 3.5) = -75 + 5P \Rightarrow 168 = 7P \Rightarrow P = 24, Q = 45$$

Demanders now pay $P + 3.5 = 27.5$

e. How is the relative burden of this tax shared between producers and consumers? Does this allocation seem in accord with the elasticity estimates from part b? In general, who pays the producer's share of this tax?

Supplier's price falls by 1, demanders price rises by 2.5. Hence demanders pay most of the tax, which might be expected since demand is less elastic than supply. The "supplier's share" on the tax will be paid by which even input gives rise to the upward slope of the supply curve – that is, by whichever input has an inelastic supply to this industry.

