Homework #2 Answer Key

1. a. If your income is $10,000, your price elasticity of demand as the price of DVDs rises from $8 to $10 is \[ \frac{(40 - 32)/36}{(10 - 8)/9} = 0.22/0.22 = 1. \] If your income is $12,000, the elasticity is \[ \frac{(50 - 45)/47.5}{(10 - 8)/9} = 0.11/0.22 = 0.5. \]

b. If the price is $12, your income elasticity of demand as your income increases from $10,000 to $12,000 is \[ \frac{(30 - 24)/27}{(12,000 - 10,000)/11,000} = 0.22/0.18 = 1.22. \] If the price is $16, your income elasticity of demand as your income increases from $10,000 to $12,000 is \[ \frac{(12 - 8)/10}{(12,000 - 10,000)/11,000} = 0.40/0.18 = 2.2. \]

2. a. If Maria always spends one-third of her income on clothing, then her income elasticity of demand is one, because maintaining her clothing expenditures as a constant fraction of her income means the percentage change in her quantity of clothing must equal her percentage change in income.

b. Maria's price elasticity of clothing demand is also one, because every percentage point increase in the price of clothing would lead her to reduce her quantity purchased by the same percentage.

c. Because Maria spends a smaller proportion of her income on clothing, then for any given price, her quantity demanded will be lower. Thus, her demand curve has shifted to the left. Because she will again spend a constant fraction of her income on clothing, her income and price elasticities of demand remain one.

3. a. With a price elasticity of demand of 0.4, reducing the quantity demanded of cigarettes by 20% requires a 50% increase in price, because 20/50 = 0.4. With the price of cigarettes currently $2, this would require an increase in the price to $3.33 a pack using the midpoint method (note that \((3.33 - 2)/2.67 = .50\)).

b. The policy will have a larger effect five years from now than it does one year from now. The elasticity is larger in the long run, because it may take some time for people to reduce their cigarette usage. The habit of smoking is hard to break in the short run.

c. Because teenagers do not have as much income as adults, they are likely to have a higher price elasticity of demand. Also, adults are more likely to be addicted to cigarettes, making it more difficult to reduce their quantity demanded in response to a higher price.

4. A worldwide drought could increase the total revenue of farmers if the price elasticity of demand for grain is inelastic. The drought reduces the supply of grain, but if demand is inelastic, the reduction of supply causes a large increase in price. Total farm revenue would rise as a result. If there is only a drought in Kansas, Kansas' production is not a large enough proportion of the total farm product to have much impact on the price. As a result, price does not change (or changes by only a slight amount), while the output by Kansas farmers declines, thus reducing their income.

5. a. The imposition of a binding price floor in the cheese market is shown in Figure 4. In the absence of the price floor, the price would be \( P_1 \) and the quantity would be \( Q_1 \). With the floor set at \( P_f \), which is greater than \( P_1 \), the quantity demanded is \( Q_d \), while quantity supplied is \( Q_s \), so there is a surplus of cheese in the amount \( Q_s - Q_d \).
b. The farmers’ complaint that their total revenue has declined is correct if demand is elastic. With elastic demand, the percentage decline in quantity would exceed the percentage rise in price, so total revenue would decline.

c. If the government purchases all the surplus cheese at the price floor, producers benefit and taxpayers lose. Producers would produce quantity $Q_3$ of cheese, and their total revenue would increase substantially. However, consumers would buy only quantity $Q_2$ of cheese, so they are in the same position as before. Taxpayers lose because they would be financing the purchase of the surplus cheese through higher taxes.

6. a. The equilibrium price of Frisbees is $8 and the equilibrium quantity is six million Frisbees.

b. With a price floor of $10, the new market price is $10 because the price floor is binding. At that price, only two million Frisbees are sold, because that is the quantity demanded.

c. If there’s a price ceiling of $9, it has no effect, because the market equilibrium price is $8, which is below the ceiling. So the market price is $8 and the quantity sold is six million Frisbees.
7. a. Figure 9 shows the effects of the minimum wage. In the absence of the minimum wage, the market wage would be $w_1$ and $Q_1$ workers would be employed. With the minimum wage ($w_m$) imposed above $w_1$, the market wage is $w_m$, the number of employed workers is $Q_2$, and the number of workers who are unemployed is $Q_3 - Q_2$. Total wage payments to workers are shown as the area of rectangle ABCD, which equals $w_m$ times $Q_2$.

![Figure 9](image)

b. An increase in the minimum wage would decrease employment. The size of the effect on employment depends only on the elasticity of demand. The elasticity of supply does not matter, because there is a surplus of labor.

c. The increase in the minimum wage would increase unemployment. The size of the rise in unemployment depends on both the elasticities of supply and demand. The elasticity of demand determines the change in the quantity of labor demanded, the elasticity of supply determines the change in the quantity of labor supplied, and the difference between the quantities supplied and demanded of labor is the amount of unemployment.

d. If the demand for unskilled labor were inelastic, the rise in the minimum wage would increase total wage payments to unskilled labor. With inelastic demand, the percentage decline in employment would be lower than the percentage increase in the wage, so total wage payments increase. However, if the demand for unskilled labor were elastic, total wage payments would decline, because then the percentage decline in employment would exceed the percentage increase in the wage.

8. a. The effect of a $0.50 per cone subsidy is to shift the demand curve up by $0.50 at each quantity, because at each quantity a consumer's willingness to pay is $0.50 higher. The effects of such a subsidy are shown in Figure 12. Before the subsidy, the price is $P_1$. After the subsidy, the price received by sellers is $P_s$ and the effective price paid by consumers is $P_d$, which equals $P_s$ minus $0.50$. Before the subsidy, the quantity of cones sold is $Q_1$; after the subsidy the quantity increases to $Q_2$. 
b. Because of the subsidy, consumers are better off, because they consume more at a lower price. Producers are also better off, because they sell more at a higher price. The government loses, because it has to pay for the subsidy.

9. a. If gasoline refineries are operating at near full capacity, supply is likely to be highly inelastic.

b. The burden of a tax falls on the side of the market that is relatively more inelastic. Thus, it will be suppliers who will benefit from the temporary suspension of the federal gasoline tax.