

Microeconomics, Module 9: "Welfare Economics and the Gains from Trade" (Chapter 8)

Illustrative Test Questions

(The attached PDF file has better formatting.)

Question 9.1: Marginal Value

All but which of the following are true regarding marginal value?

- A. The value of a good is amount a consumer is willing to pay for it.
- B. As a consumer acquires more of an item, its marginal value decreases.
- C. The marginal value curve for a good corresponds to the demand curve for the good.
- D. In a competitive market, a good's marginal value is the same for all consumers.
- E. All of A, B, C, and D are true.

Answer 9.1: D

Statement A: Value means the value in exchange. Brealey and Myers (corporate finance course) have the same perspective: value means market value, or the amount that others are willing to pay for the item.

Question: Suppose a loaf of bread sells for \$2.00 and an ounce of cocaine sells for \$200. Does this mean that an ounce of cocaine is 100 times as valuable as a loaf of bread?

Answer: In economics, value differs by consumer. If you are willing to pay \$5.00 for the loaf of bread and only 5¢ for the ounce of cocaine, the loaf of bread is worth 100 times as much to you as is the ounce of cocaine. But if a crack addict is willing to pay \$200 for the ounce of cocaine and only 20¢ for the loaf of bread, the ounce of cocaine is worth 1,000 times as much as the loaf of bread to the crack addict.

Statement B is the law of decreasing marginal utility.

Question: It seems that value depends on the consumer; for each consumer, value depends on how much of the good the consumer now has. Doesn't a good have an objective value?

Answer: Value is like beauty; it exists only in the eye of the beholder.

Statement C: The demand curve says that a consumer buys Q units if the price is P . We assume the units are continuous for the argument below.

- If the Q^{th} unit were worth more than P , the consumer would buy more than Q units at a price of P .
- If the Q^{th} unit were worth less than P , the consumer would buy fewer than Q units at a price of P .

We infer that the Q^{th} unit is worth P ; this is the marginal value of the Q^{th} unit.

Statement D: The price is the same for all consumers. But consumers have different tastes, so the marginal value differs by consumer. Some consumers buy none of the good, since its value for them is lower than the equilibrium price.

Question 9.2: Producers' Surplus vs Consumers' Surplus

The equilibrium price and quantity are $P = 25$ and $Q = 100$, and the supply and demand curves are linear. In which scenario below is producers' surplus greater than consumers' surplus?

- A. The supply curve is highly inelastic; the demand curve is highly elastic.

- B. The supply curve is highly elastic; the demand curve is highly inelastic.
- C. Both the supply and demand curves are high inelastic.
- D. Both the supply and demand curves are high elastic.
- E. Producers' surplus is never greater than consumers' surplus.

Answer 9.2: A

Elastic curves have little or no surplus; inelastic curves have high surplus. The more inelastic the curve, the greater is the social gain.

Question: Why does elasticity affect surplus?

Answer: Consider the water-diamond paradox. Water is cheap, because it is abundant; diamonds are expensive, because they are scarce. The marginal value of water is less than the marginal value of a diamond.

But the demand curve for water is inelastic. We need water to live, and we will pay any price for the first cup of water if we have none. The demand curve for diamonds is elastic: we buy if the price is right, but we have no need to buy if the price is too high. The total value of water is greater than the total value of diamonds.

Value is total area under the demand curve. The demand curve for diamonds intersects the Y axis at a high enough price that we don't want any diamonds. The demand curve for water never intersects the Y axis, since we need water to live; the curve becomes inelastic as Q becomes small. The perfectly inelastic demand curve causes infinite value for water.

Exercise 9.3: Sales Tax and Dead Weight Loss

The table below shows the equilibrium quantity, the consumers' surplus, and the producers' surplus in a competitive industry before and after a sales tax of \$20 a unit. What is the dead weight loss from the sales tax?

	<i>Before Tax</i>	<i>After Tax</i>
<i>Quantity</i>	20	10
<i>Consumers' Surplus</i>	200	50
<i>Producers' Surplus</i>	200	50

Solution 9.3: The reduction in consumers' surplus plus producers' surplus is $(200 + 200) - (50 + 50) = 300$. The tax revenue is $20 \times 10 = 200$. The dead weight loss is $300 - 200 = 100$.

Question: Can we work out the supply and demand curves from the information given?

Answer: In general, we can't, since the curve may be any form. But if the curves are linear, we can work out the curves. A linear demand curve $Q = \alpha - \beta P$ has a slope of $-\beta$. If the equilibrium quantity is Q_0 , the consumers' surplus is $\frac{1}{2} Q_0 \times Q_0 \times \beta$.

- Before the tax, this is $\frac{1}{2} \times 20 \times 20 \times \beta = 200 \Rightarrow \beta = 1$.
- After the tax, this is $\frac{1}{2} \times 10 \times 10 \times \beta = 50 \Rightarrow \beta = 1$.

A linear supply curve $Q = \alpha' - \beta' P$ has a slope of $-\beta'$. If the equilibrium quantity is Q_0 , the producers' surplus is $\frac{1}{2} Q_0 \times Q_0 \times \beta'$.

- Before the tax, this is $\frac{1}{2} \times 20 \times 20 \times \beta' = 200 \Rightarrow \beta' = 1$.
- After the tax, this is $\frac{1}{2} \times 10 \times 10 \times \beta' = 50 \Rightarrow \beta' = 1$.

We can not derive α or α' for this exercise.

Question 9.4: Consumers' Surplus

All but which of the following are true regarding consumers' and producers' surplus?

- A. If Jacob buys five loaves when loaves of bread sell for \$1.50 apiece, the marginal value of the 4th loaf to Jacob is *less* than \$1.50.
- B. Consumer's surplus is the value of one's purchases minus the price paid for them.
- C. Consumer's surplus is the area under the demand curve and above the price out to the quantity demanded.
- D. Consumers' surplus plus producers' surplus is the social gain from trade.
- E. All of A, B, C, and D are true.

Answer 9.4: A (The marginal value of the 4th loaf is *more* than \$1.50.)

Statements B and C are identical, since value is the area under the demand curve.

Statement D assumes there is no government tax or subsidy.

- With a tax, the gain from trade = consumers' surplus + producers' surplus + the tax.
- With a subsidy, the gain from trade = consumers' surplus + producers' surplus – the subsidy.

Question 9.5: Social Gain

Suppose the government levies a sales tax on a good. With the sales tax, the consumers' surplus is 800, the producers' surplus is 500, and the tax is 400. What is the total social gain from trade?

- A. 800
- B. 900
- C. 1,000
- D. 1,300
- E. 1,700

Answer 9.5: E

social gain = consumers' surplus + producers' surplus + tax revenue

Question 9.6: Sales Tax and Dead Weight Loss

The government imposes a sales tax of \$10 for each unit bought. In which scenario below is the dead weight loss the greatest?

- A. The demand curve is elastic and the supply curve is inelastic.
- B. The demand curve is inelastic and the supply curve is elastic.
- C. The supply and demand curves are both elastic.
- D. The supply and demand curves are both inelastic.
- E. None of A, B, C, or D is true.

Answer 9.6: C

When the supply and demand curves are elastic, the quantity reduction is the greatest.

Question 9.7: Dead Weight Loss

The table below shows five scenarios of a sales tax or subsidy. For each scenario, the table shows

- The equilibrium price without the tax or subsidy (100 in each scenario).
- The price paid to producers with the tax or subsidy.
- The price paid by consumers with the tax or subsidy.
- The tax or subsidy per item.

Which scenario has the smallest dead weight loss?

Scenario	Price			
	No Tax/Subsidy	To Producers	By Consumers	Tax/Subsidy
A	100	100	110	10
B	100	95	105	10
C	100	97	103	6
D	100	105	95	10
E	100	103	97	6

Answer 9.7: A

The demand curve is inelastic; quantity doesn't change and the dead weight loss is zero.

Question: How do we know that quantity doesn't change in scenario A?

Answer: The producers get 100 before the tax/subsidy and 100 after the tax/subsidy, so they produce and sell the same quantity.

Question 9.8: Consumers' Tastes

The equilibrium price and quantity are P_0 and Q_0 . Consumers' tastes change, and the demand curve becomes more elastic, but the equilibrium price and quantity are still P_0 and Q_0 . Which of the following is true?

- Consumers' surplus decreases.
- Consumers' surplus increases.
- Producers' surplus decreases.
- Producers' surplus increases.
- None of A, B, C, or D is true.

Answer 9.8: A

Consumers' surplus is the area of the triangle with base Q (which has not changed) and height being the maximum a consumer would pay for the good minus the price (which has not changed). Since the demand curve is now more elastic, and the point (P_0, Q_0) has not changed, the maximum price for the first good consumed is lower.