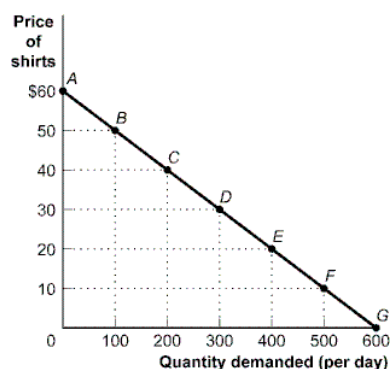


# Substitution and Income Effects and Elasticity

## Problem Set

- The price elasticity of demand measures the responsiveness of the change in:
  - quantity demanded to a change in consumer income
  - price to a change in quantity demanded.
  - the slope of the demand curve to a change in price.
  - the slope of the demand curve to a change in quantity demanded.
  - quantity demanded to a change in price.**
- If the price of a good is increased by 20% and the quantity demanded changes by 15%, then the price elasticity of demand is equal to:
  - 0.75.**
  - 0.33.
  - 1.33.
  - 1.
  - zero.
- A men's tie store sold an average of 30 ties per day when the price was \$6 per tie. The same store sold 60 of the same ties per day when the price was \$3 per tie. In this case, the absolute value of the price elasticity of demand, is:
  - greater than zero but less than 1.
  - equal to 1.**
  - greater than 1 but less than 3.
  - greater than 3.
  - equal to zero.
- If the estimated price elasticity of demand for foreign travel is 4, then:
  - a 20% decrease in the price of foreign travel will increase quantity demanded by 80%.**
  - demand for foreign travel is inelastic.
  - a 10% increase in the price of foreign travel will increase quantity demanded by 40%
  - a 20% increase in the price of foreign travel will increase quantity demanded by 80%.
  - a 20% decrease in the price of foreign travel will increase quantity demanded by 5%.
- Jane is a utility-maximizing consumer who is consuming the optimal quantity of Goods X and Y and spending her entire budget. If the price of Good X falls, we would see Jane:
  - decrease her consumption of Good X if Good X is an inferior good and the income effect is weaker than the substitution effect.
  - increase her consumption of Good X if Good X is an inferior good and the income effect is stronger than the substitution effect.
  - not alter her consumption of Good X if Good X is a normal good and the income effect is equal to the substitution effect.
  - decrease her consumption of Good X if Good X is a normal good and the income effect reinforces the substitution effect.
  - increase her consumption of Good X if Good X is a normal good, as the income effect reinforces the substitution effect.**

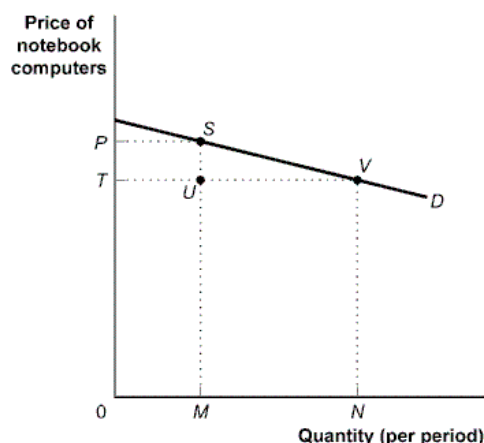
Use the graph below to answer questions 6-7.



- The price elasticity of demand for the segment AB, is:
  - equal to zero.
  - greater than one.**
  - less than one, but greater than zero.
  - equal to one.
  - impossible to determine without more information.
- The price elasticity of demand for the segment EF, using the midpoint method, is:
  - greater than one.
  - equal to zero.
  - equal to one.
  - less than one, but greater than zero.**
  - impossible to determine without more information.
- The price of gasoline rises 5% and the quantity of gasoline purchased falls 1%. The price elasticity of demand is equal to \_\_\_\_\_ and demand is described as \_\_\_\_\_.
  - 0.2; inelastic**
  - 5; inelastic
  - 0.2; elastic
  - 5; elastic
  - 1; unit elastic
- Assume that as the price of cauliflower falls, the income effect causes consumers to buy less cauliflower. We can conclude that cauliflower is:
  - an inferior good.**
  - a luxury good.
  - a normal good.
  - expensive.
  - a large component of consumer budgets.
- A local restaurant has estimated that the price elasticity of demand for meals is equal to 2. If the restaurant increases menu prices by 5%, they can expect the number of customers to decrease by \_\_\_\_\_ and total revenue to \_\_\_\_\_.
  - 10%; increase
  - 5%; stay constant
  - 10%; decrease**
  - 2.5%; decrease
  - 2.5%; increase

11. Each month Jacquelyn spends exactly \$50 on ice cream regardless of the price of each container. Jacquelyn's price elasticity of demand for ice cream is:
- 0.
  - 1.**
  - greater than 1, but less than 5.
  - less than 1, but greater than 0.
  - greater than 5.
12. Sonik, a local wireless phone company, tested the effect of a price reduction for text messaging. It lowered prices from \$0.08 to \$0.04 per message and found that the number of messages sent tripled. This means the:
- demand for text messaging is inelastic in this price range.
  - demand curve for text messaging shifted to the right.
  - supply curve of text messaging shifted to the left.
  - demand for text messaging is elastic in this price range.**
  - Demand for text messaging is unitary elastic in this price range.
13. The university president believes that increasing student tuition by 5% will increase revenues. If the president is correct that revenues will increase, then the tuition increase will:
- reduce the number of students enrolling by less than 5%.**
  - reduce the number of students enrolling by more than 5%.
  - reduce the number of students enrolling by exactly 5%.
  - increase the number of students enrolling by exactly 5%.
  - increase the number of students enrolling by less than 5%.
14. Suppose the price elasticity of demand for fishing lures equals 1 in South Carolina and 0.63 in Alabama. To increase revenue, fishing lure manufacturers should:
- lower prices in each state.
  - raise prices in each state.
  - lower prices in South Carolina and raise prices in Alabama.
  - leave prices unchanged in South Carolina and raise prices in Alabama.**
  - raise prices in South Carolina and leave prices unchanged in Alabama.
15. The price elasticity of demand for lettuce has been estimated to be 2.58. If an insect infestation destroys 10% of the nation's lettuce crop, how will that affect the price of lettuce and total revenue from lettuce, all other things unchanged?
- Price will stay the same; total revenue will fall.
  - Price will decrease; total revenue will rise.
  - Price will stay the same; total revenue will remain unchanged.
  - Price will increase; total revenue will fall.**
  - Price will increase; total revenue will rise.
16. The demand for agricultural output is price inelastic. This means that if farmers, taken collectively, have a huge crop, they will experience:
- lower prices, greater quantities sold, and lower incomes.**
  - lower prices, greater quantities sold, and higher incomes.
  - lower prices, lower quantities sold, and lower incomes.
  - higher prices, higher quantities sold, and higher incomes.
  - higher prices; lower quantities sold, and higher incomes.

Use the graph below to answer questions 17-18.



17. The change in the firm's total revenue resulting from a change in price from P to T suggests that demand is:
- perfectly price-inelastic.
  - perfectly price-elastic
  - price-inelastic.
  - price unit-elastic.
  - price-elastic.**
18. The seller's total revenue at point V equals the:
- area OTVN.**
  - area OPSVN.
  - distance OT.
  - distance NV.
  - area SUV.
19. The absolute value of the price elasticity of demand for ground beef has been estimated to be 1.0. If mad cow disease strikes the United States and a large percentage of the cattle are removed from the market, how will that affect quantity demanded for hamburger and total expenditures on hamburger, all other things equal?
- Quantity demanded falls and total expenditures remain unchanged.**
  - Quantity demanded falls and total expenditures fall by more than 1%.
  - Quantity demanded rises and total expenditures fall by less than 1%.
  - Quantity demanded falls and total expenditures fall by 1%.
  - Quantity demanded remains unchanged and total expenditures remain unchanged.
20. The absolute value of the price elasticity of demand for soft drinks has been estimated to be 0.55. If the government enacts a major increase in the tax on imported sugar (a major ingredient in soft drink manufacture), how will that affect the price of soft drinks and total expenditures on soft drinks, all other things equal?
- Prices rise and total expenditures remain unchanged.
  - Prices rise and total expenditures fall.
  - Prices remain unchanged and total expenditures remain unchanged.
  - Prices fall and total expenditures rise.
  - Prices rise and total expenditures rise.**

21. In each of the following cases, state whether the income effect, the substitution effect, or both are significant. In which cases do they move in the same direction? In opposite directions? Why?
- Orange juice represents a small share of Clare's spending. She buys more lemonade and less orange juice when the price of orange juice goes up. She does not change her spending on other goods. **Since the spending on orange juice is a small share of Clare's spending, the income effect from a rise in the price of orange juice is insignificant. Only the substitution effect, represented by the substitution of lemonade in place of orange juice is significant.**
  - Apartment rents have risen dramatically this year. Since rent absorbs a major part of her income, Delia moves to a smaller apartment. Assume that rental housing is a normal good. **Since rent is a large share of Delia's expenditures, the increase in rent generates an income effect, making Delia feel poorer. Since housing is a normal good for Delia, the income and substitution effects move in the same direction, leading her to reduce her consumption of housing by moving to a smaller apartment.**
22. Assume that in a typical week you consume both hamburgers and chicken sandwiches and that both are normal goods. If the price of burgers increases while the price of chicken remains the same then:
- How will the increase in the price of burgers affect your purchase of burgers? **You will purchase fewer hamburgers during the week due to the rise in price. The quantity demanded for hamburgers will change (a movement along the demand curve).**
  - How does the substitution effect impact your decision? **You will purchase more chicken sandwiches due to the substitution effect.**
  - How does the income effect impact your decision? **Depending on how large a share of your spending is made up of burgers, the income effect will either be significant or insignificant. In either case, you will be relatively less wealthy as a result of the increased price of burgers, which will reduce your purchase of burgers.**
23. The price of strawberries falls from \$1.50 to \$1.00 per carton and the quantity demanded goes from 100,000 to 200,000 cartons. Use the midpoint method to find the price elasticity of demand. **Elasticity = 1.7**
24. At the present level of consumption (4,000 movie tickets) and at the current price (\$5 per ticket) the price elasticity of demand for movie tickets is 1. Using the midpoint method, calculate the percentage by which the owners of movie theaters must reduce price in order to sell 5,000 tickets. **Reduce ticket prices by 22% to generate a 22% increase in quantity demanded.**
25. For each case, choose the condition that characterizes demand: elastic demand, inelastic demand, or unit-elastic demand.
- Total revenue decreases when price increases. **Elastic demand. Consumers are highly responsive to changes in price. For a rise in price, the quantity effect (which tends to reduce total revenue) outweighs the price effect (which tends to increase total revenue). Overall, this leads to a fall in total revenue.**
  - The additional revenue generated by an increase in quantity sold is exactly offset by revenue lost from the fall in price received per unit. **Unit-elastic demand. Here the revenue lost to the fall in price is exactly equal to the revenue gained from higher sales. The quantity effect offsets the price effect.**
  - Total revenue falls when output increases. **Inelastic demand. Consumers are relatively unresponsive to changes in price. For consumers to purchase a given percent increase in output, the price must fall by an even greater percent. The price effect of a fall in price (which tends to reduce total revenue) outweighs the quantity effect (which tends to increase total revenue). As a result, total revenue decreases.**
  - Producers in an industry find they can increase their total revenues by working together to reduce industry output. **Inelastic demand. Consumers are relatively unresponsive to price, so a given percent fall in output is accompanied by an even greater percent rise in price. The price effect of a rise in price (which tends to increase total revenue) outweighs the quantity effect (which tends to reduce total revenue). As a result, total revenue increases.**

26. For the following goods, what is the elasticity of demand? Explain. What is the shape of the demand curve?
- a. Demand by a snake-bit victim for an antidote. **Once bitten by a venomous snake, the victim's demand for an antidote is very likely to be perfectly inelastic because there is no substitute and it is necessary for survival. The demand curve will be vertical, at a quantity equal to the needed dose.**
  - b. Demand by students for green erasers. **Students' demand for green erasers is likely to be perfectly elastic because there are easily available substitutes: non-green erasers. The demand curve will be horizontal, at a price equal to that of non-green erasers.**