

# Elasticity and Its Applications

# Elasticity . . .

- ... allows us to analyze supply and demand with greater precision.
- ... is a measure of how much buyers and sellers respond to changes in market conditions

# THE ELASTICITY OF DEMAND

- **Price elasticity of demand** is a measure of how much the quantity demanded of a good responds to a change in the price of that good.
- Price elasticity of demand is the percentage change in quantity demanded given a percent change in the price.

- Availability of Close Substitutes
- Necessities versus Luxuries
- Definition of the Market
- Time Horizon

- Demand tends to be more elastic :
  - the larger the number of close substitutes.
  - if the good is a luxury.
  - the more narrowly defined the market.
  - the longer the time period.

- The price elasticity of demand is computed as the percentage change in the quantity demanded divided by the percentage change in price.

$$\text{Price elasticity of demand} = \frac{\text{Percentage change in quantity demanded}}{\text{Percentage change in price}}$$

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- Example: If the price of a cup of coffee increases from \$2.00 to \$2.20 and the amount you buy falls from 10 to 8 cups (per week), then your elasticity of demand would be calculated as:

$$\frac{\frac{(10 - 8)}{10} \times 100}{\frac{(2.20 - 2.00)}{2.00} \times 100} = \frac{20\%}{10\%} = 2$$

- Inelastic Demand

- Quantity demanded does not respond strongly to price changes.
- Price elasticity of demand is less than one.

- Elastic Demand

- Quantity demanded responds strongly to changes in price.
- Price elasticity of demand is greater than one.

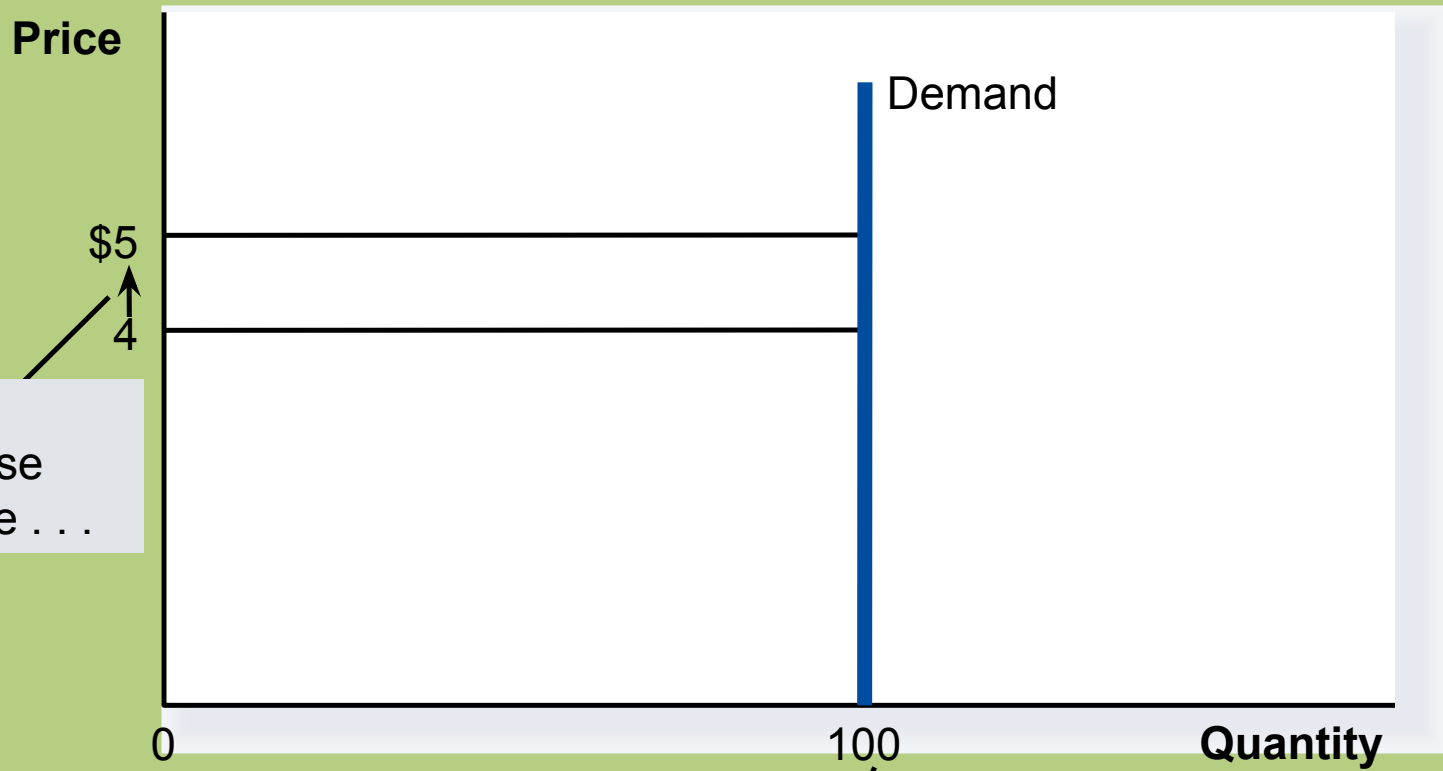


- Perfectly Inelastic
  - Quantity demanded does not respond to price changes.
- Perfectly Elastic
  - Quantity demanded changes infinitely with any change in price.
- Unit Elastic
  - Quantity demanded changes by the same percentage as the price.

- Because the price elasticity of demand measures how much quantity demanded responds to the price, it is closely related to the slope of the demand curve.

# The Price Elasticity of Demand

## (a) Perfectly Inelastic Demand: Elasticity Equals 0

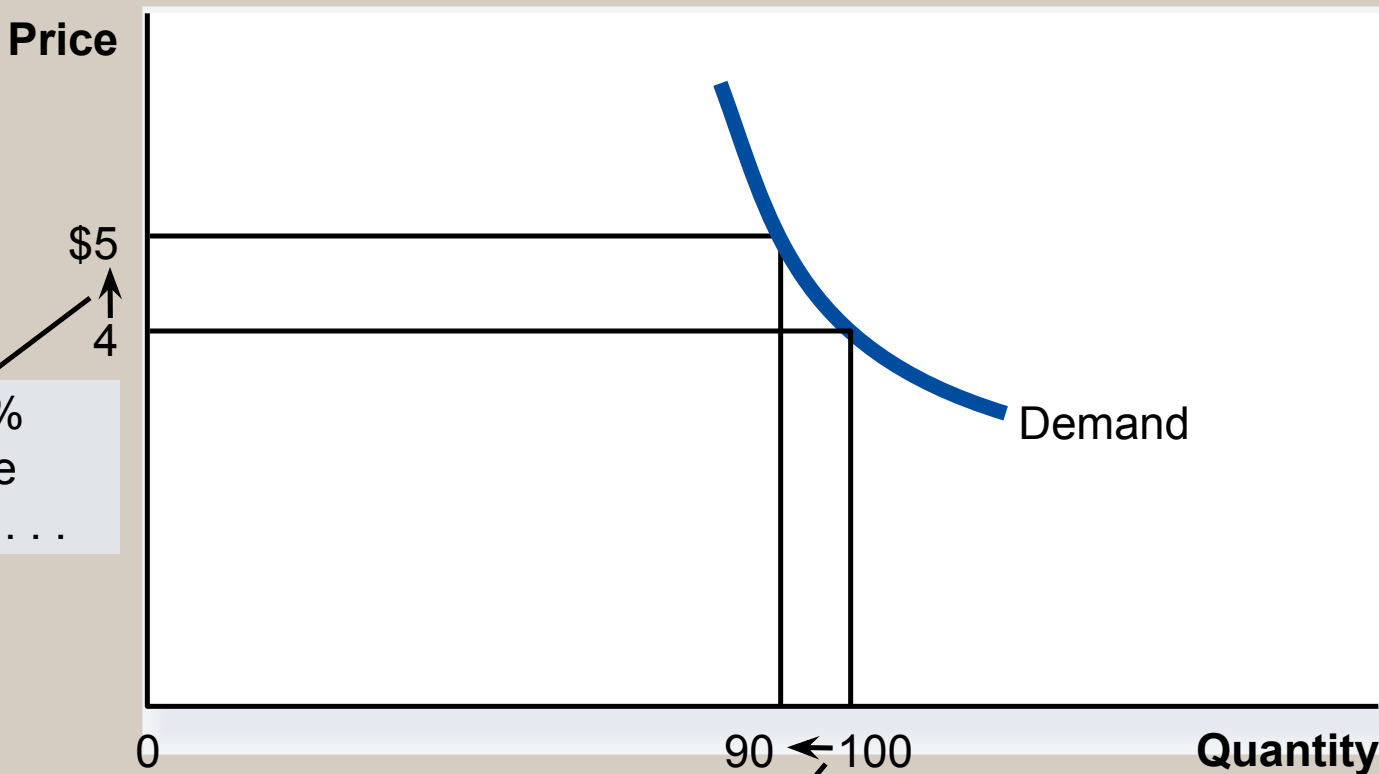


1. An increase in price . . .

2. . . leaves the quantity demanded unchanged.

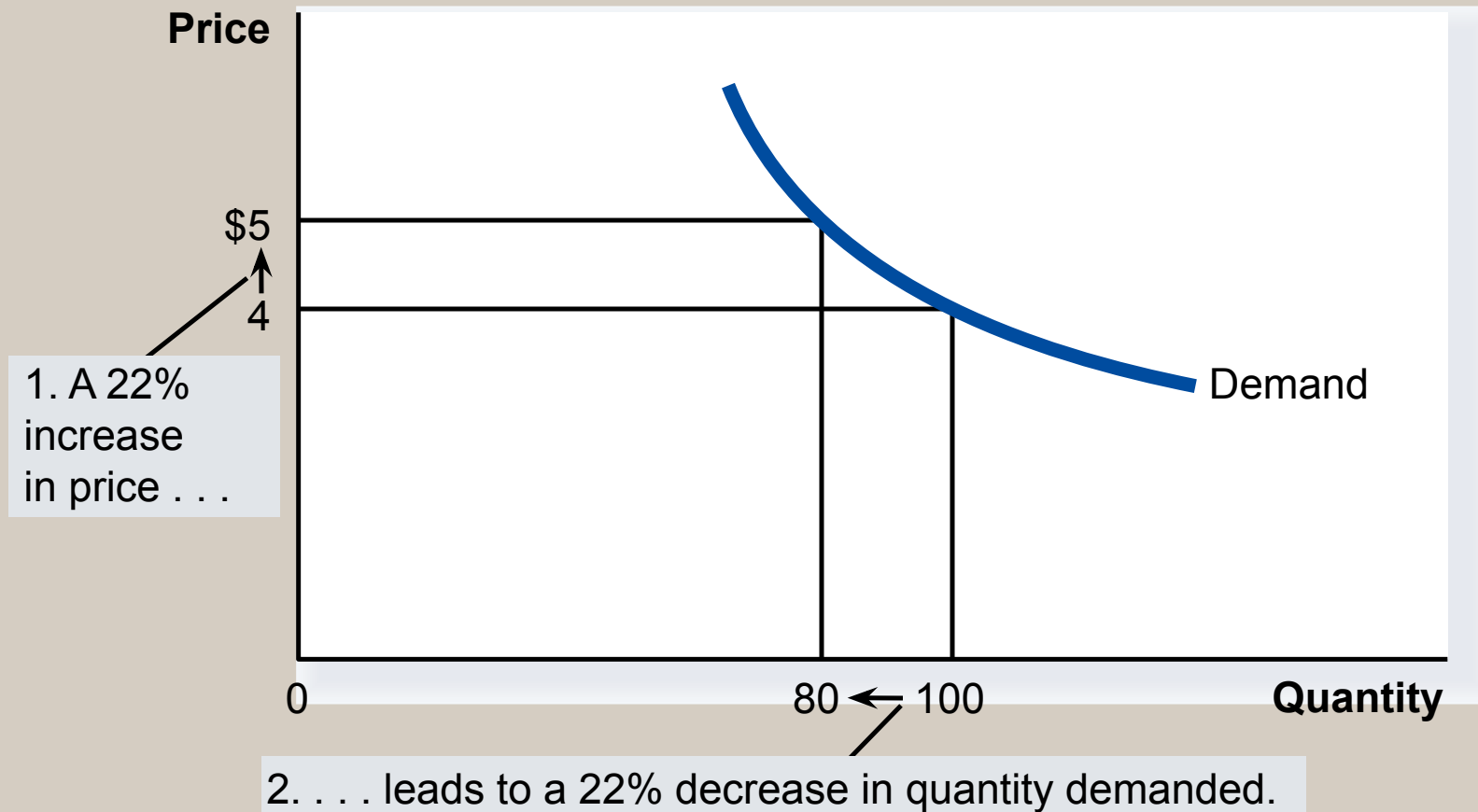
# The Price Elasticity of Demand

## (b) Inelastic Demand: Elasticity Is Less Than 1



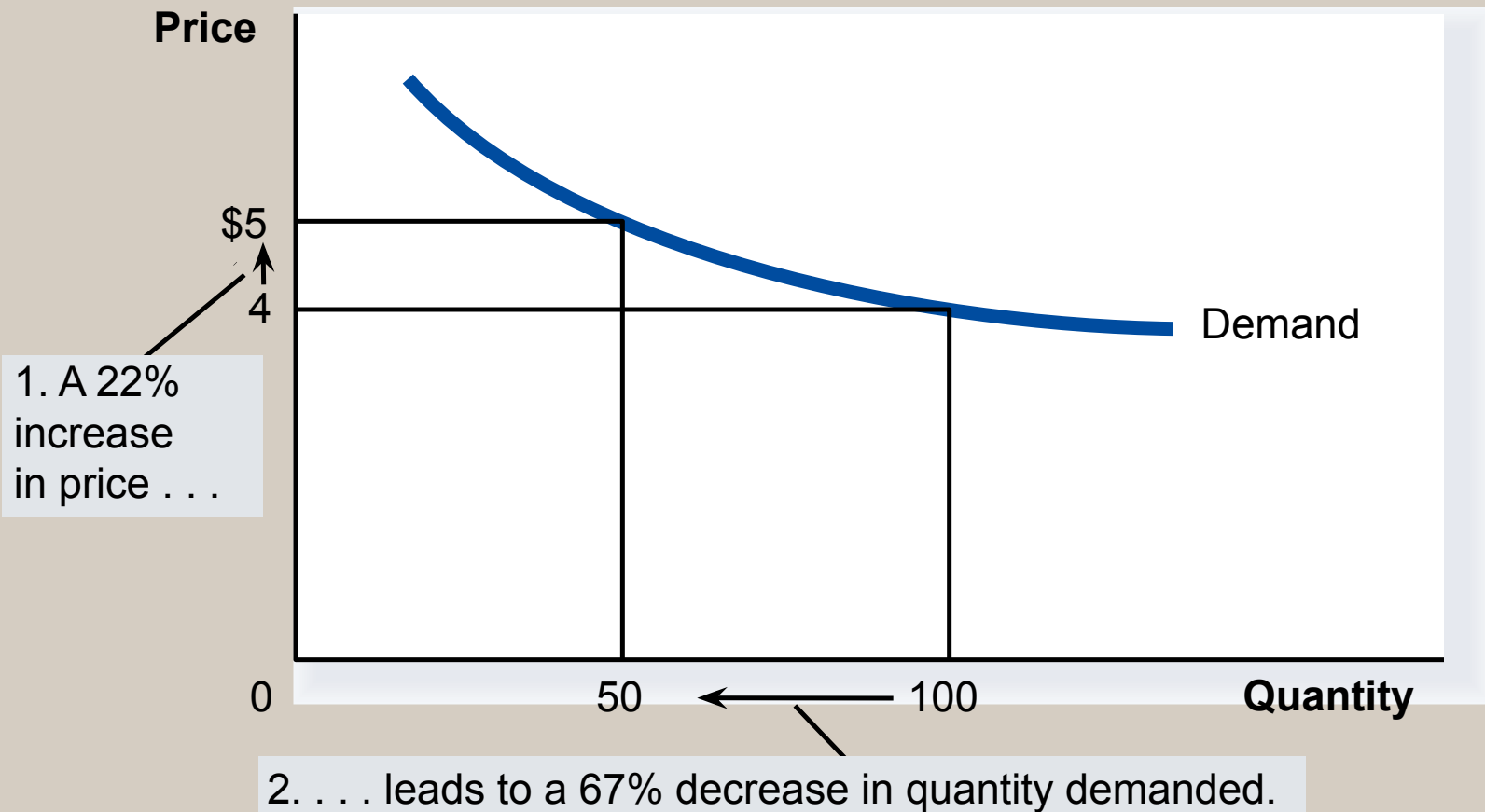
# The Price Elasticity of Demand

## (c) Unit Elastic Demand: Elasticity Equals 1



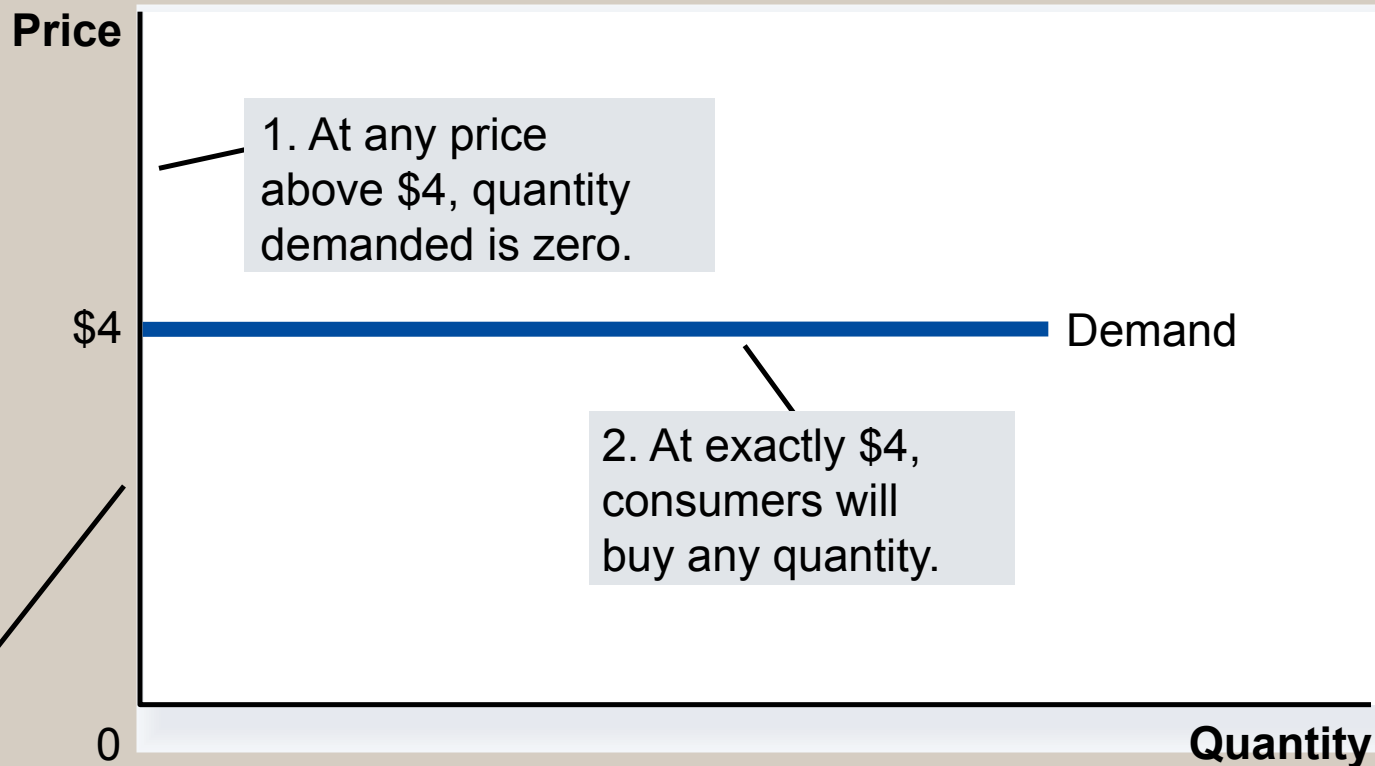
# The Price Elasticity of Demand

## (d) Elastic Demand: Elasticity Is Greater Than 1



# The Price Elasticity of Demand

## (e) Perfectly Elastic Demand: Elasticity Equals Infinity



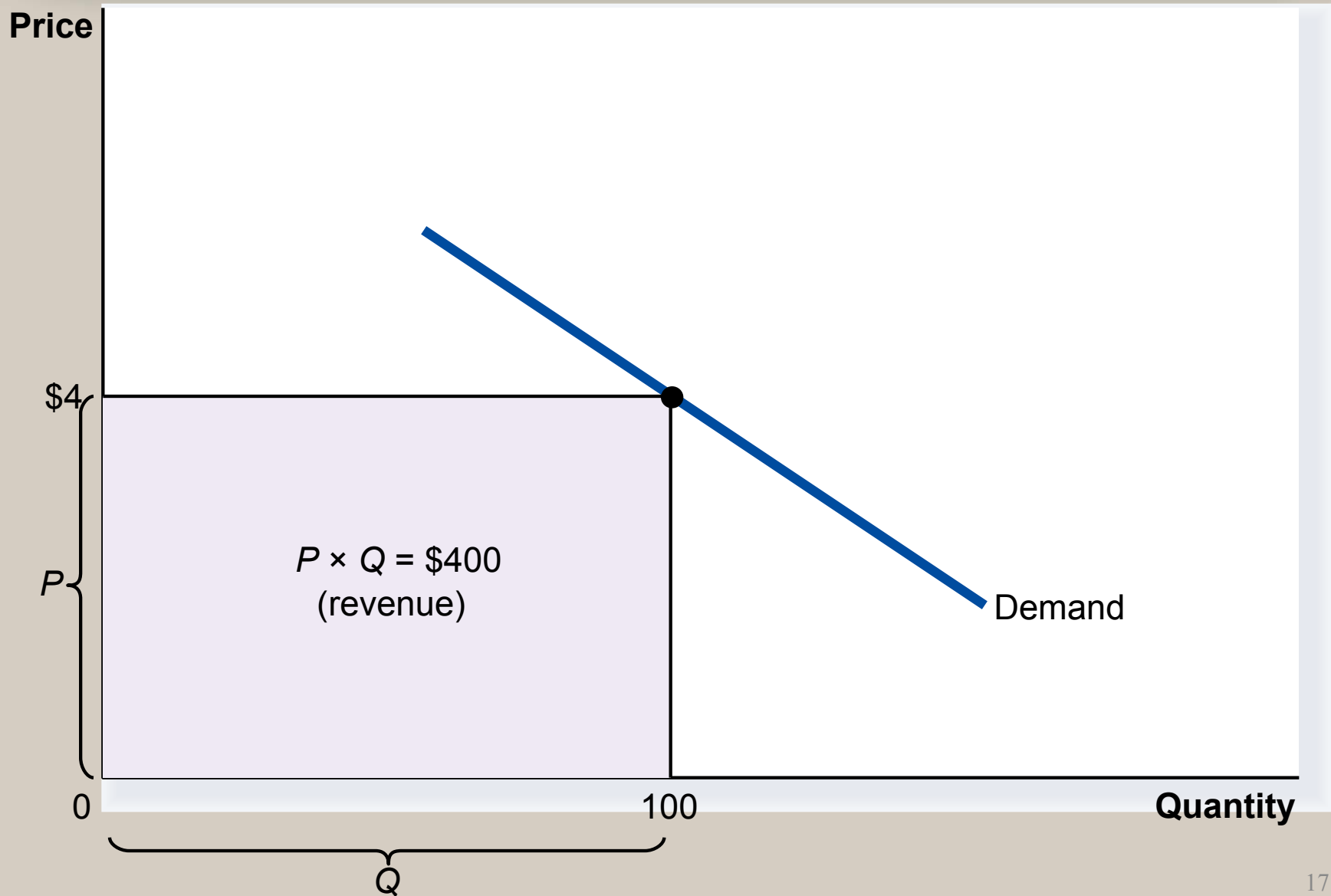
3. At a price below \$4, quantity demanded is infinite.

- ***Total revenue*** is the amount paid by buyers and received by sellers of a good.
- Computed as the price of the good times the quantity sold.

$$TR = P \times Q$$

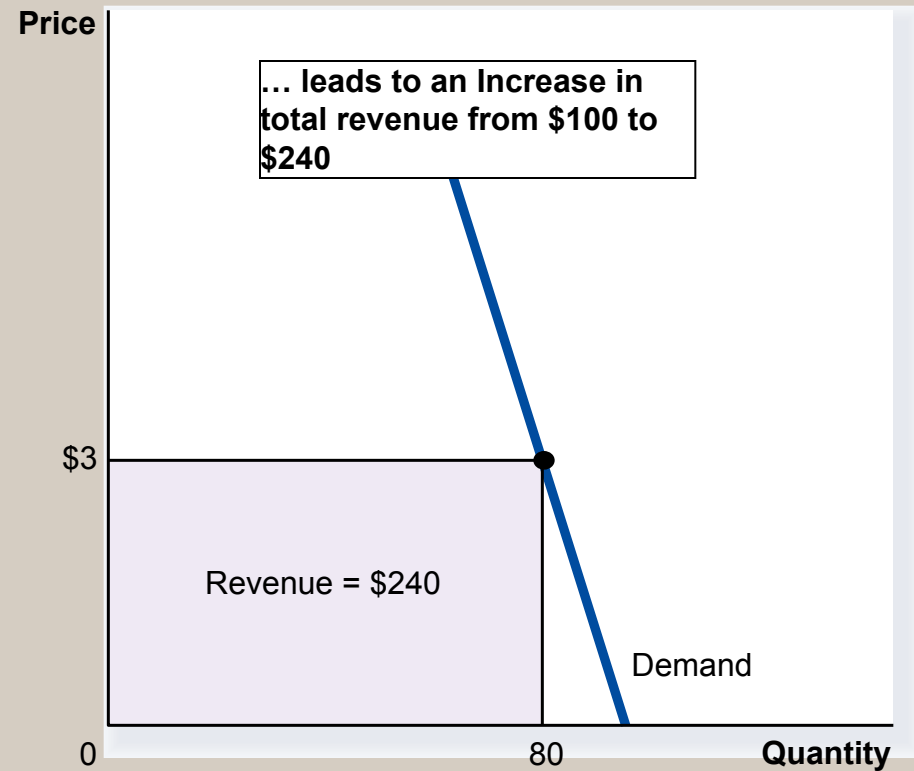
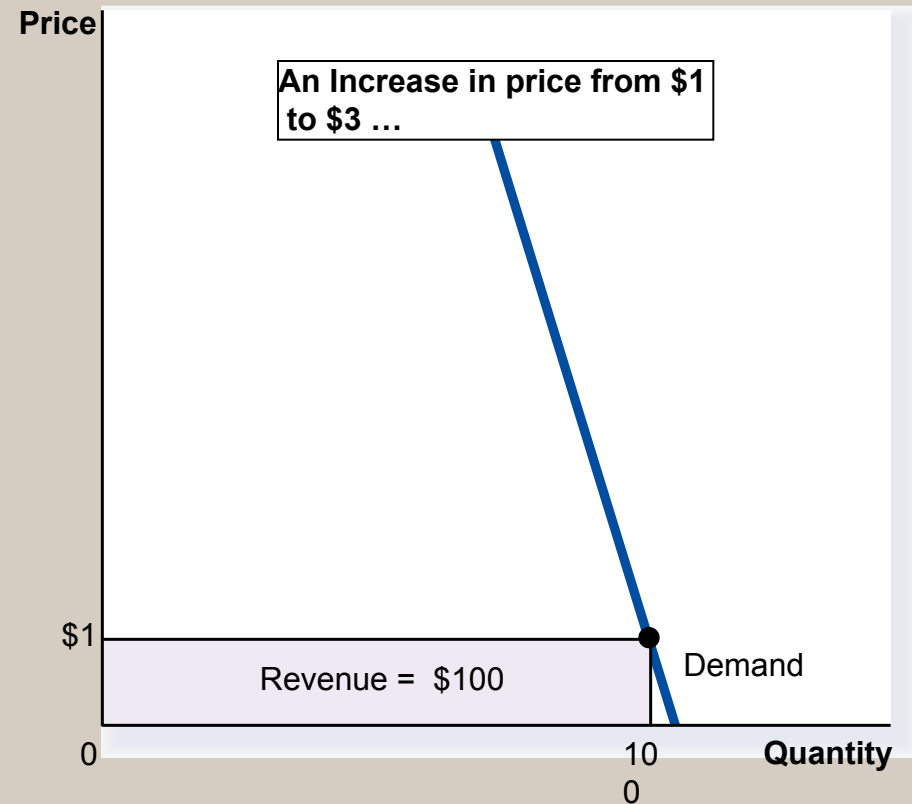


# Total Revenue



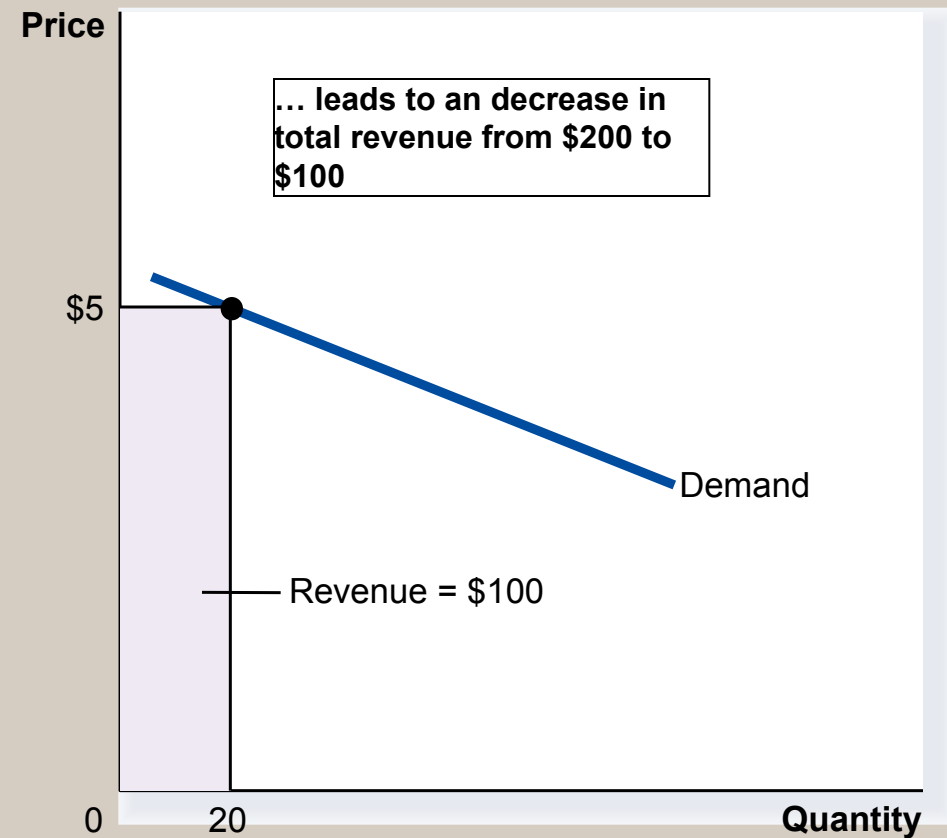
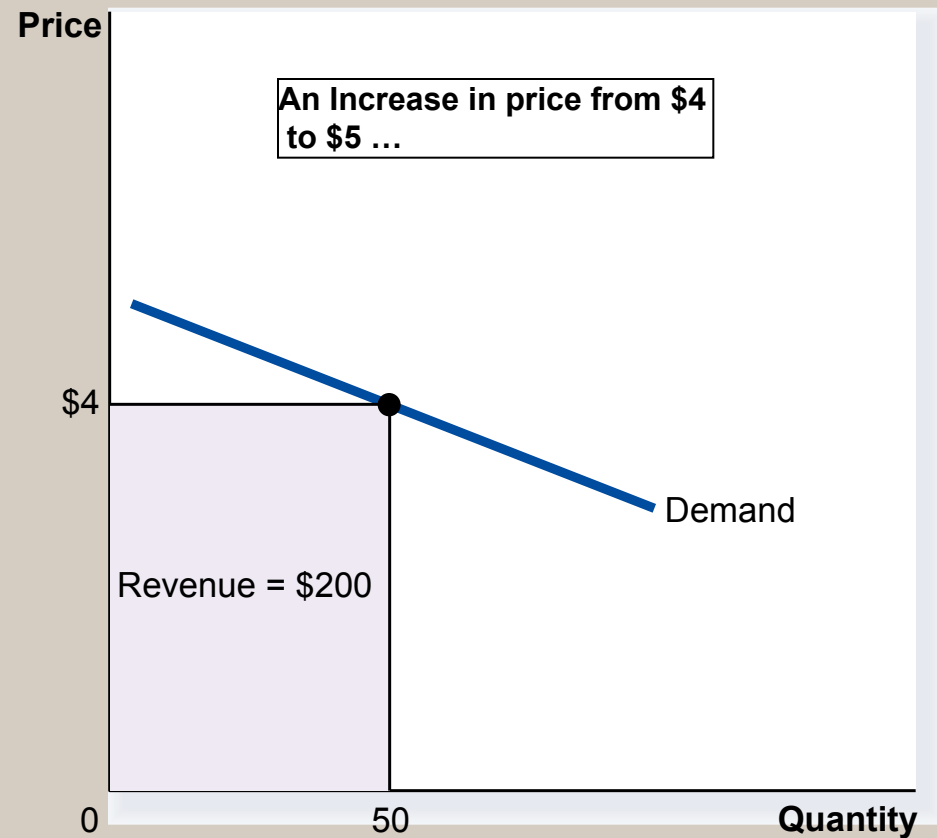
- With an inelastic demand curve, an increase in price leads to a decrease in quantity that is proportionately smaller. Thus, *total revenue increases*.

# How Total Revenue Changes When Price Changes: Inelastic Demand



- With an elastic demand curve, an increase in the price leads to a decrease in quantity demanded that is proportionately larger. Thus, *total revenue decreases*.

# How Total Revenue Changes When Price Changes: Elastic Demand



- ***Income elasticity of demand*** measures how much the quantity demanded of a good responds to a change in consumers' income.
- It is computed as the percentage change in the quantity demanded divided by the percentage change in income.

$$\text{Income elasticity of demand} = \frac{\text{Percentage change in quantity demanded}}{\text{Percentage change in income}}$$

- Types of Goods
  - Normal Goods
  - Inferior Goods
- Higher income raises the quantity demanded for normal goods but lowers the quantity demanded for inferior goods.



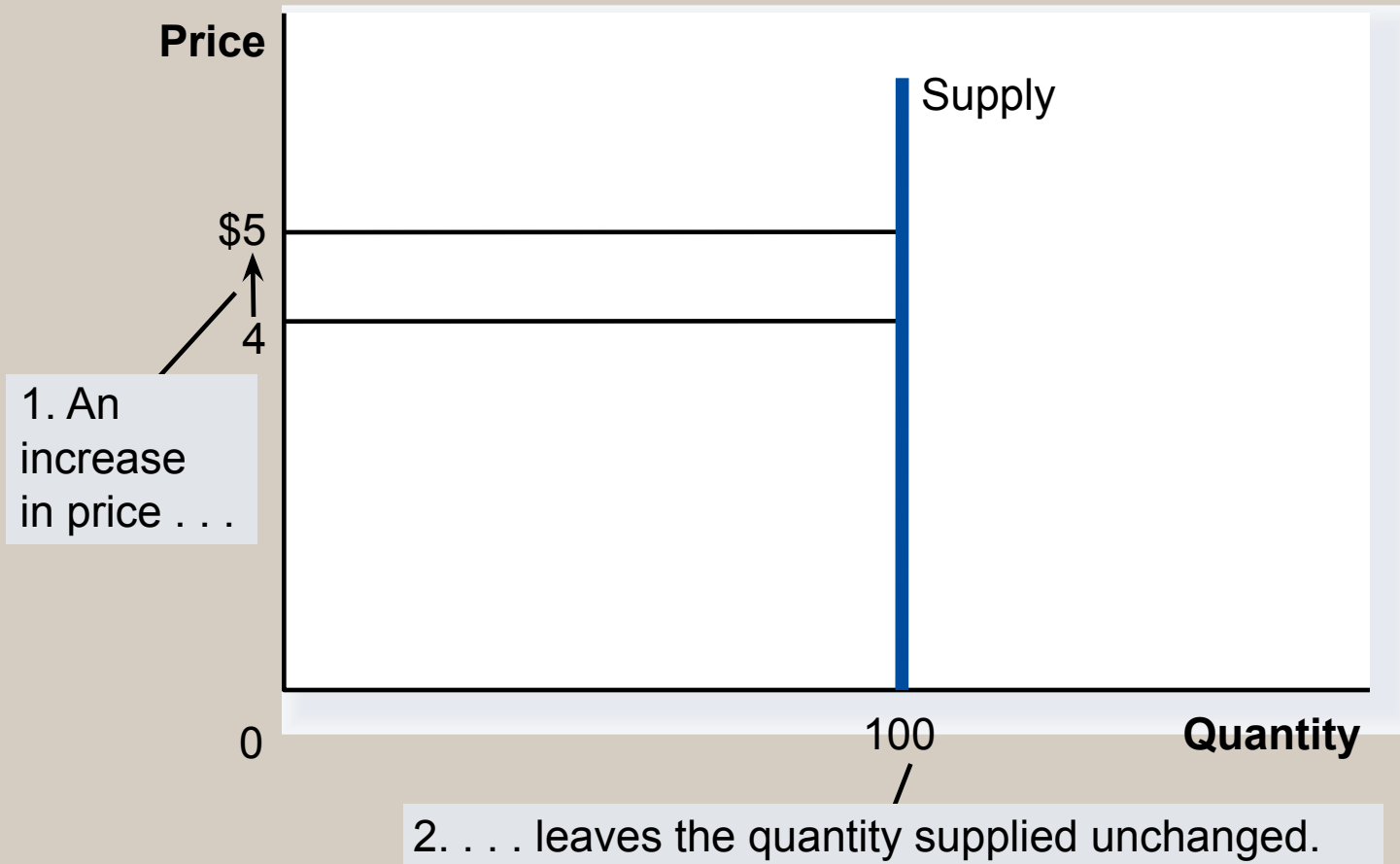
- Goods consumers regard as necessities tend to be income inelastic
  - Examples include food, fuel, clothing, utilities, and medical services.
- Goods consumers regard as luxuries tend to be income elastic.
  - Examples include sports cars, furs, and expensive foods.

# THE ELASTICITY OF SUPPLY

- ***Price elasticity of supply*** is a measure of how much the quantity supplied of a good responds to a change in the price of that good.
- Price elasticity of supply is the percentage change in quantity supplied resulting from a percent change in price.

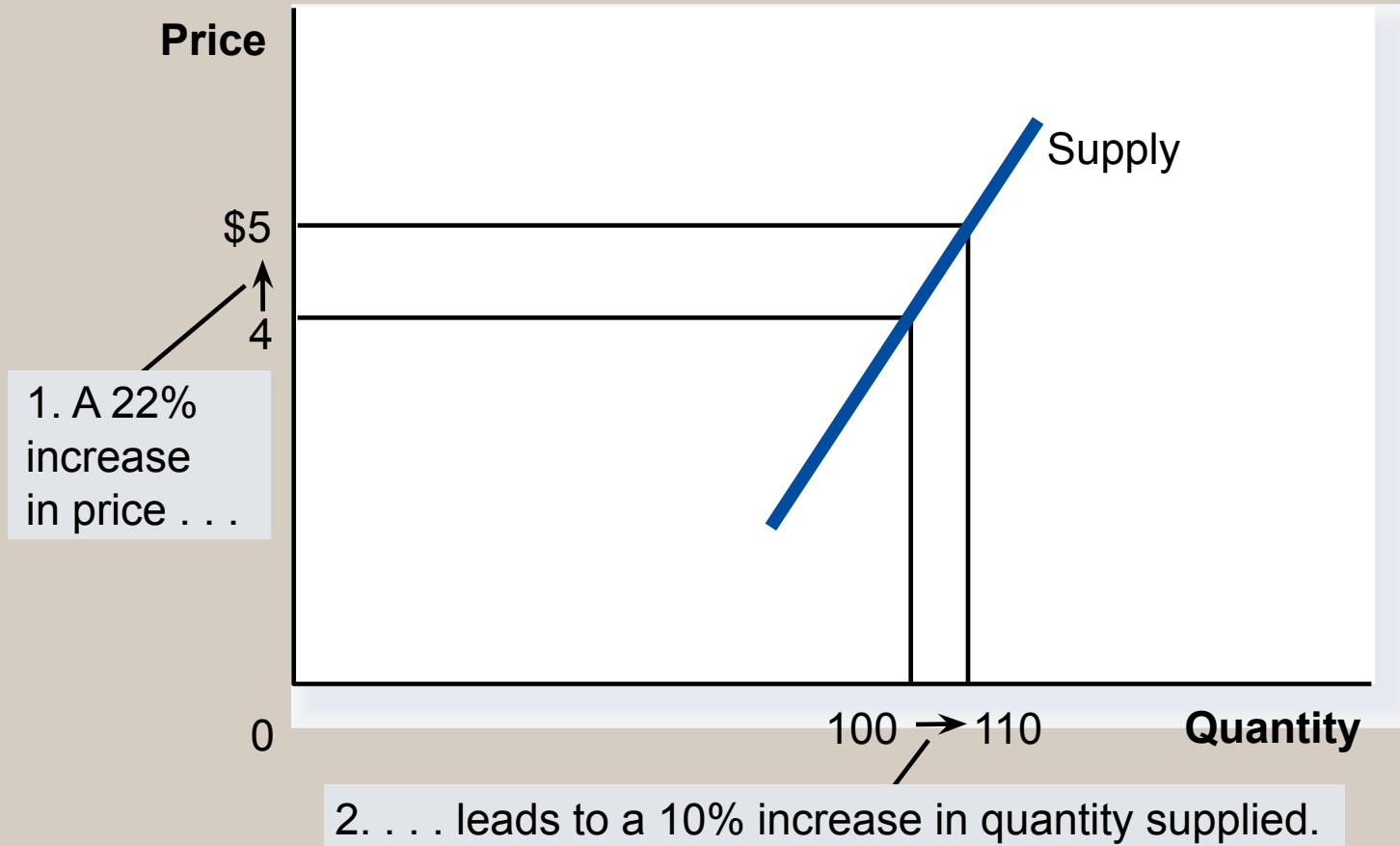
# The Price Elasticity of Supply

(a) Perfectly Inelastic Supply: Elasticity Equals 0



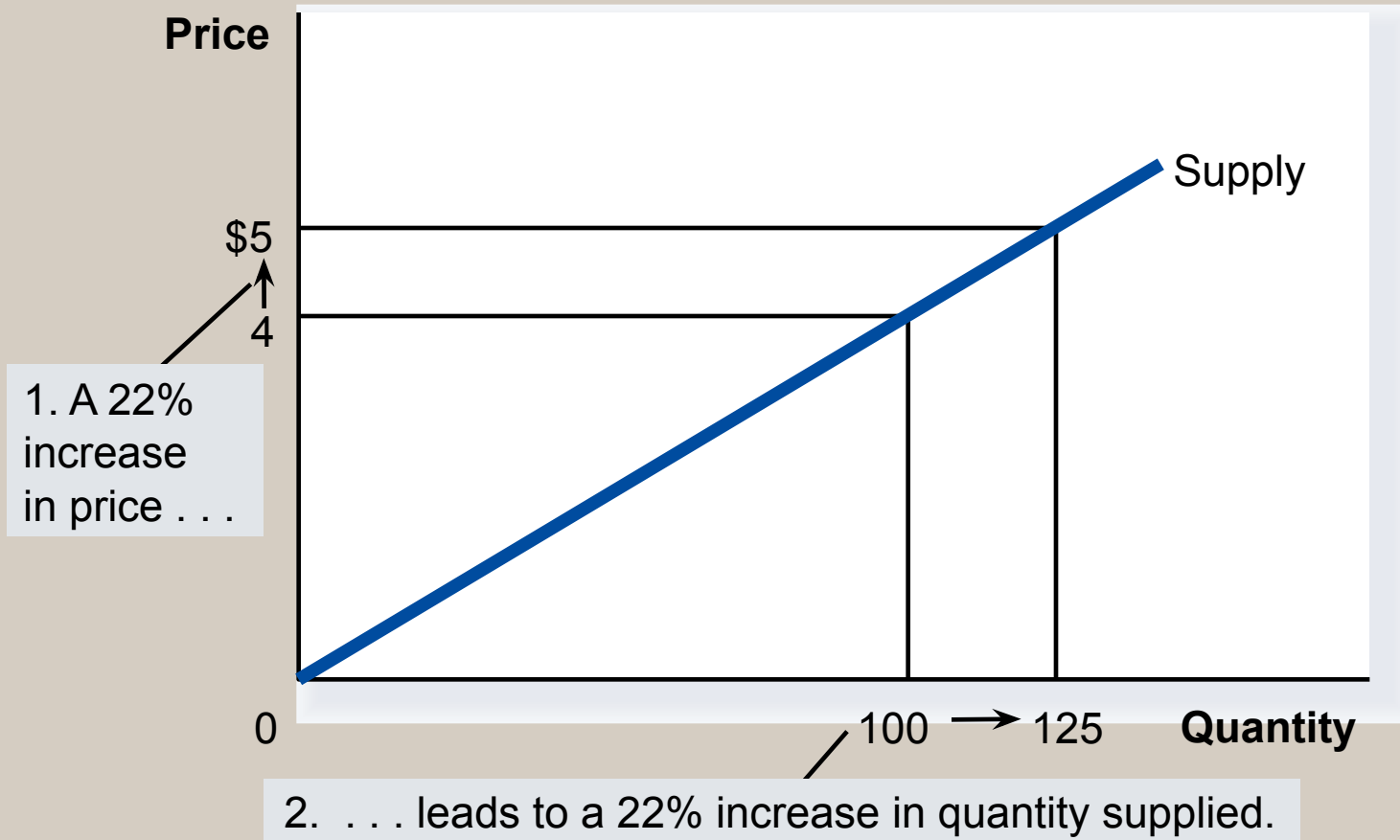
# The Price Elasticity of Supply

## (b) Inelastic Supply: Elasticity Is Less Than 1



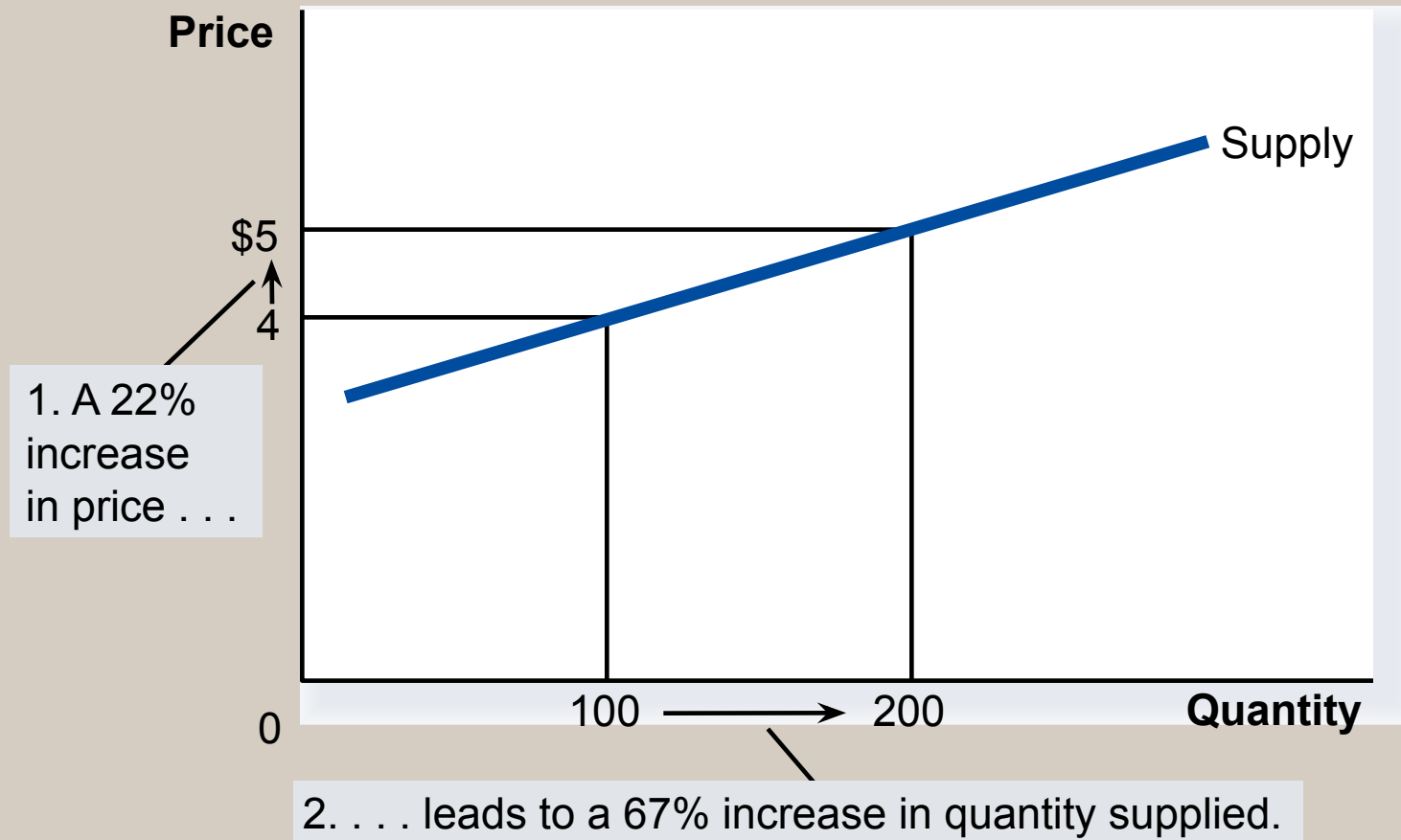
# The Price Elasticity of Supply

(c) Unit Elastic Supply: Elasticity Equals 1



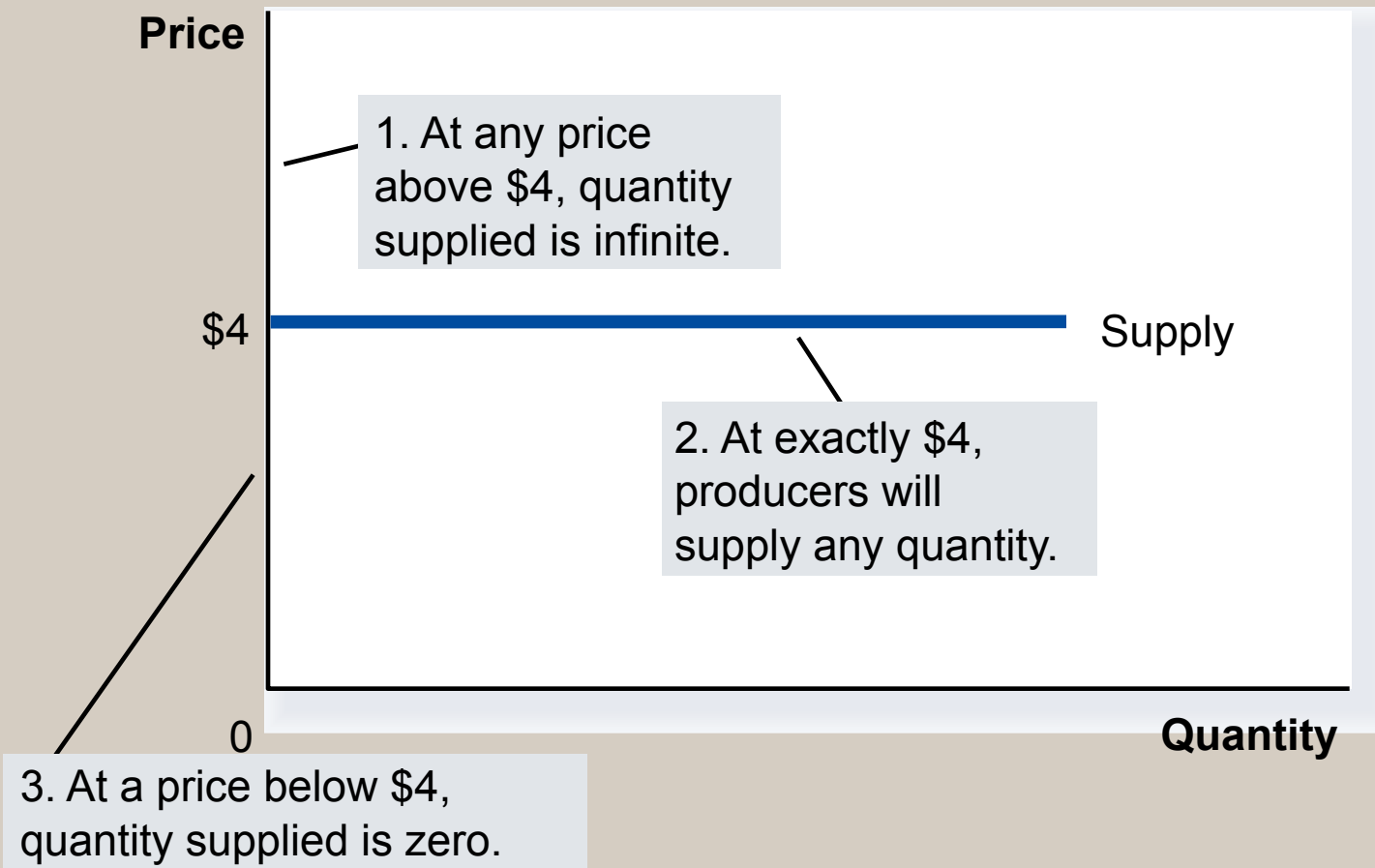
# The Price Elasticity of Supply

## (d) Elastic Supply: Elasticity Is Greater Than 1



# The Price Elasticity of Supply

## (e) Perfectly Elastic Supply: Elasticity Equals Infinity



- Ability of sellers to change the amount of the good they produce.
  - Real estate by beach is inelastic.
  - Books, cars, or manufactured goods are elastic.
- Time period.
  - Supply is more elastic in the long run.



- The price elasticity of supply is computed as the percentage change in the quantity supplied divided by the percentage change in price.

$$\text{Price elasticity of supply} = \frac{\text{Percentage change in quantity supplied}}{\text{Percentage change in price}}$$

# Summary

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- Price elasticity of demand measures how much the quantity demanded responds to changes in the price.
- Price elasticity of demand is calculated as the percentage change in quantity demanded divided by the percentage change in price.
- If a demand curve is elastic, total revenue falls when the price rises.
- If it is inelastic, total revenue rises as the price rises.

# Summary

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- The income elasticity of demand measures how much the quantity demanded responds to changes in consumers' income.
- The price elasticity of supply measures how much the quantity supplied responds to changes in the price.

# Summary

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- In most markets, supply is more elastic in the long run than in the short run.
- The price elasticity of supply is calculated as the percentage change in quantity supplied divided by the percentage change in price.
- The tools of supply and demand can be applied in many different types of markets.