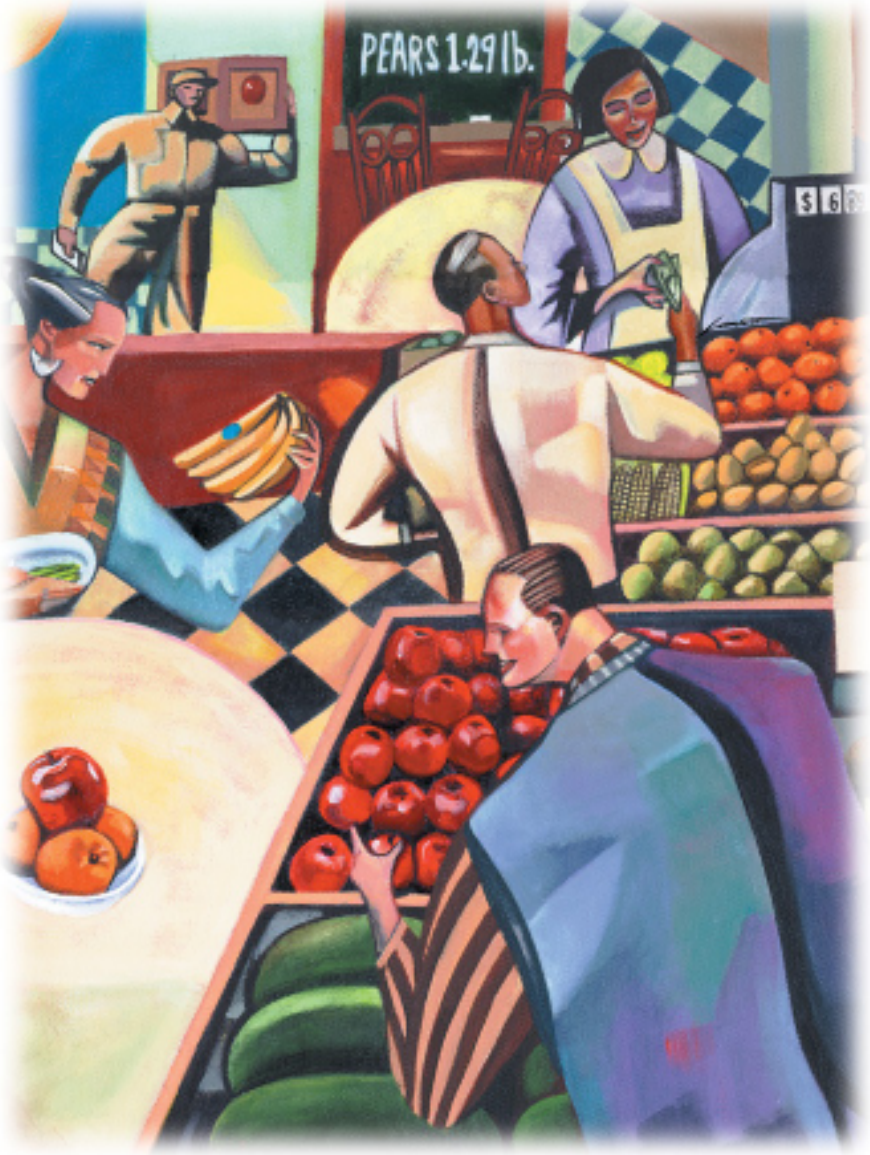


Topic 3

Elasticity and its Applications

In this chapter you will…

- Learn the meaning of the elasticity of demand.
- Examine what determines the elasticity of demand.
- Learn the meaning of the elasticity of supply.
- Examine what determines the elasticity of supply.
- Apply the concept of elasticity in three different markets.

THE ELASTICITY OF DEMAND

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

Price 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.**

The Price Elasticity of Demand and Its Determinants

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

The Price Elasticity of Demand and Its Determinants

- 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.

Computing the Price Elasticity of Demand

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

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

The Midpoint Method: A Better Way to Calculate Percentage Changes and Elasticities

- The midpoint formula is preferable when calculating the price elasticity of demand because it gives the same answer regardless of the direction of the change.

$$\text{Price elasticity of demand} = \frac{(Q_2 - Q_1) / [(Q_2 + Q_1) / 2]}{(P_2 - P_1) / [(P_2 + P_1) / 2]}$$

The Midpoint Method: A Better Way to Calculate Percentage Changes and Elasticities

- Point A: Price = $4 Quantity = 120
- Point B: Price = $6 Quantity = 80

- From Point A to Point B: Price rise = 50% and Quantity fall = 33%
- From Point B to Point A: Price fall = 33% and Quantity rise = 50%

$$\text{Price elasticity of demand} = \frac{(80 - 120) \quad [(80 + 120)/ 2]}{(6 - 4) / \quad [(6 + 4)/ 2]}$$

Mid point method

$$= 1$$

A Variety of Demand Curves

- 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.

A Variety of Demand Curves

- 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.

A Variety of Demand Curves

- **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.**

Figure 5-1 a): Perfectly Inelastic Demand

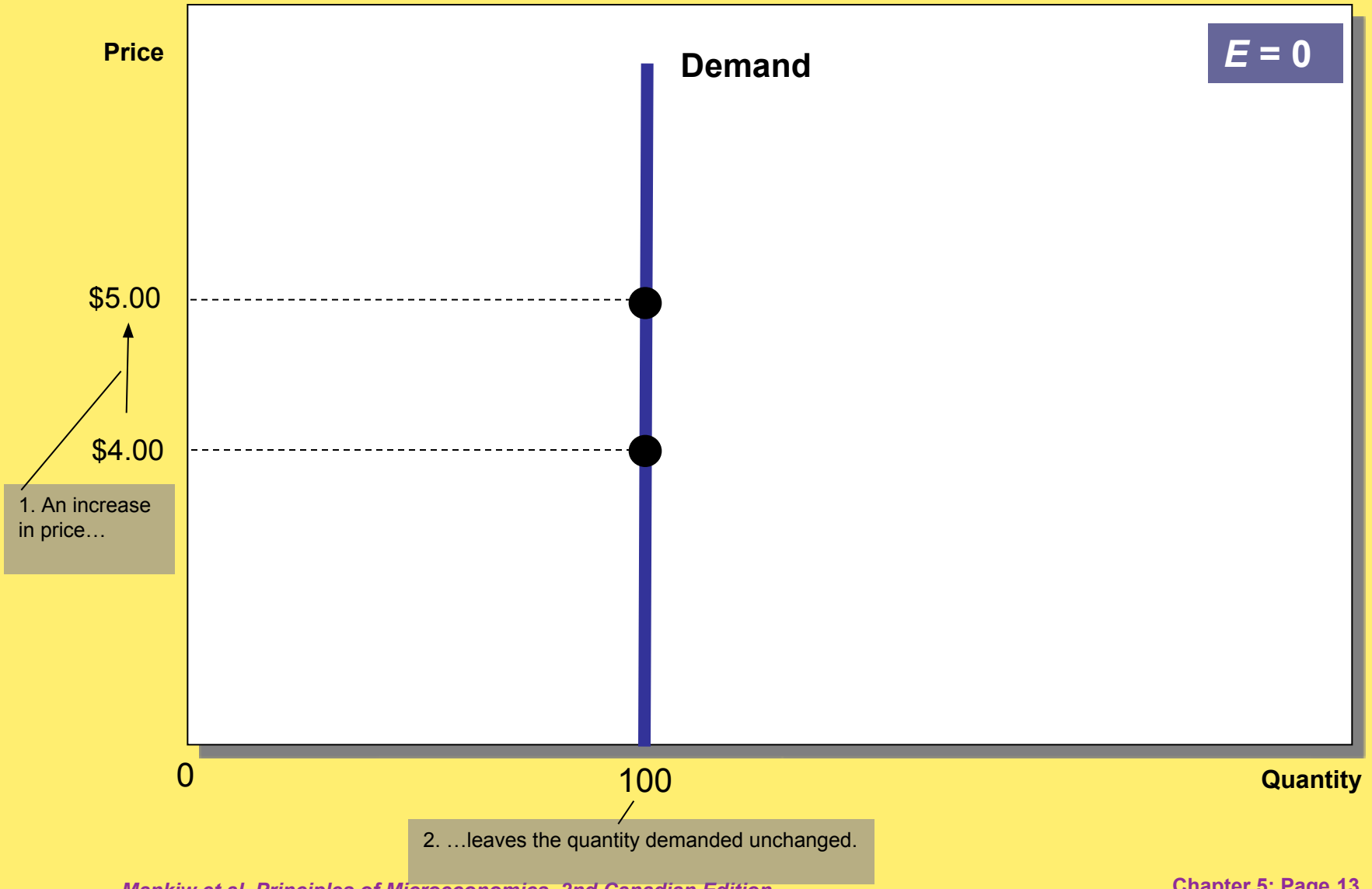


Figure 5-1 b): Inelastic Demand

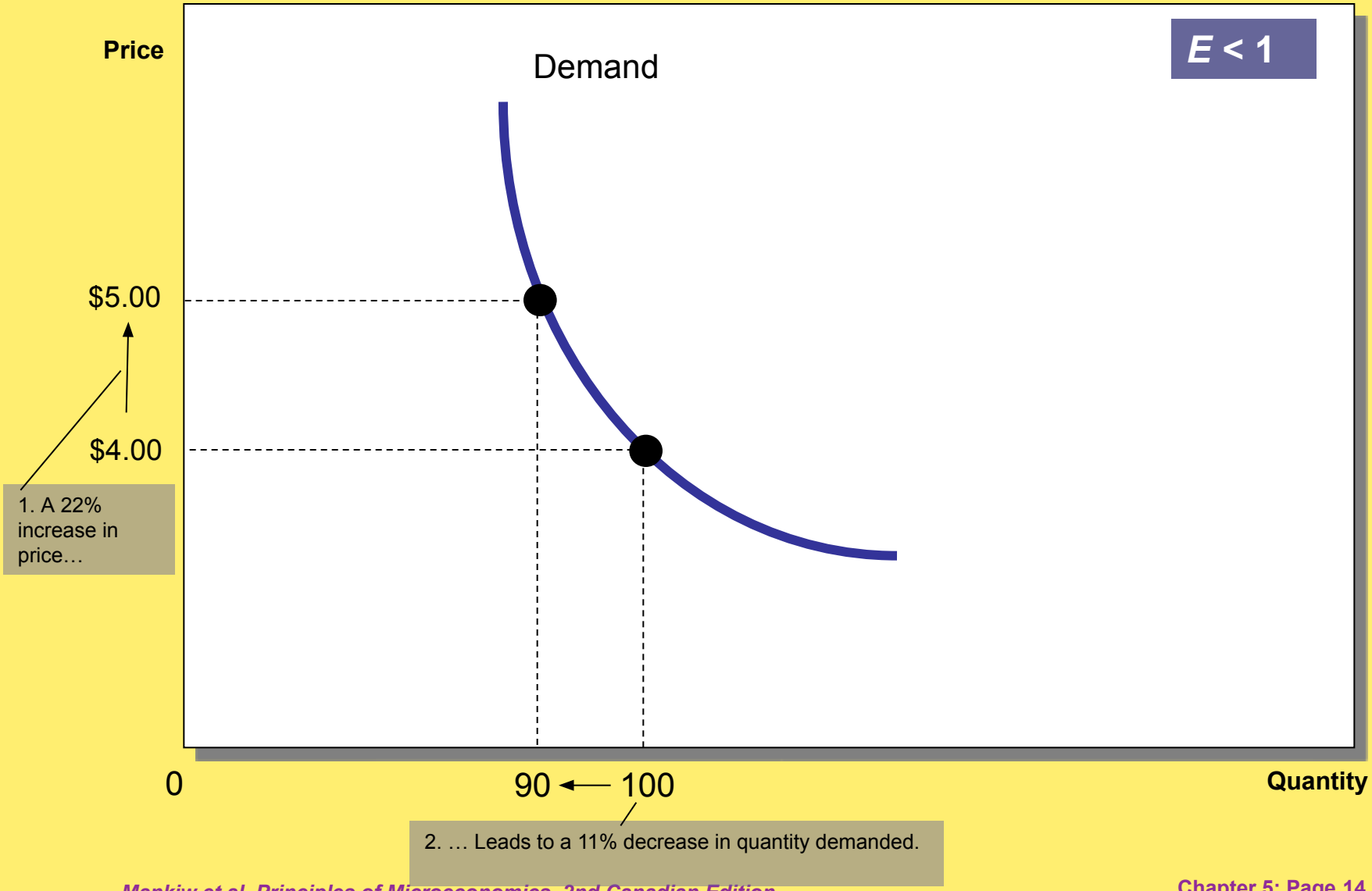


Figure 5-1 c): Unit Elastic Demand

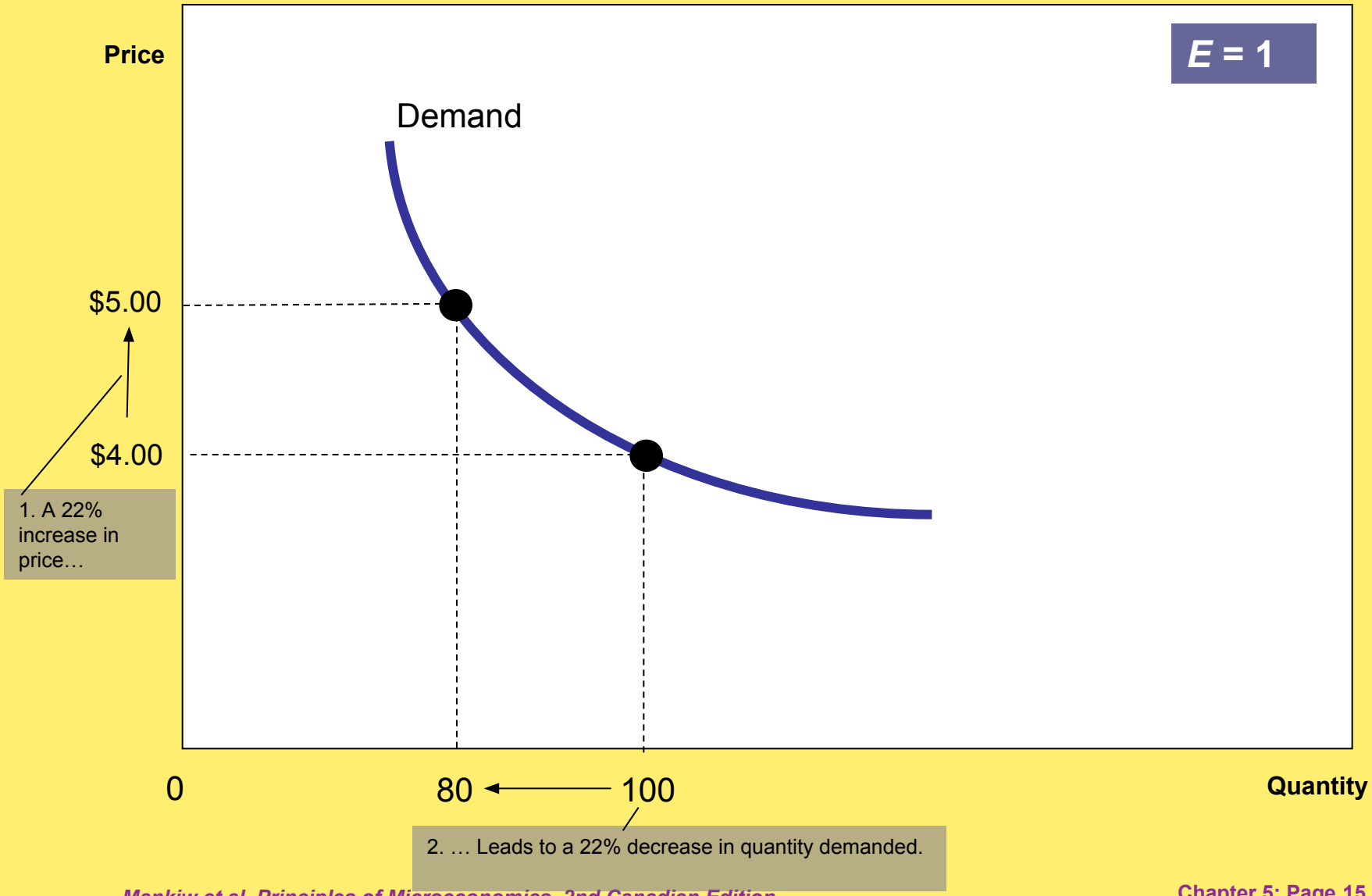


Figure 5-1 d): Elastic Demand

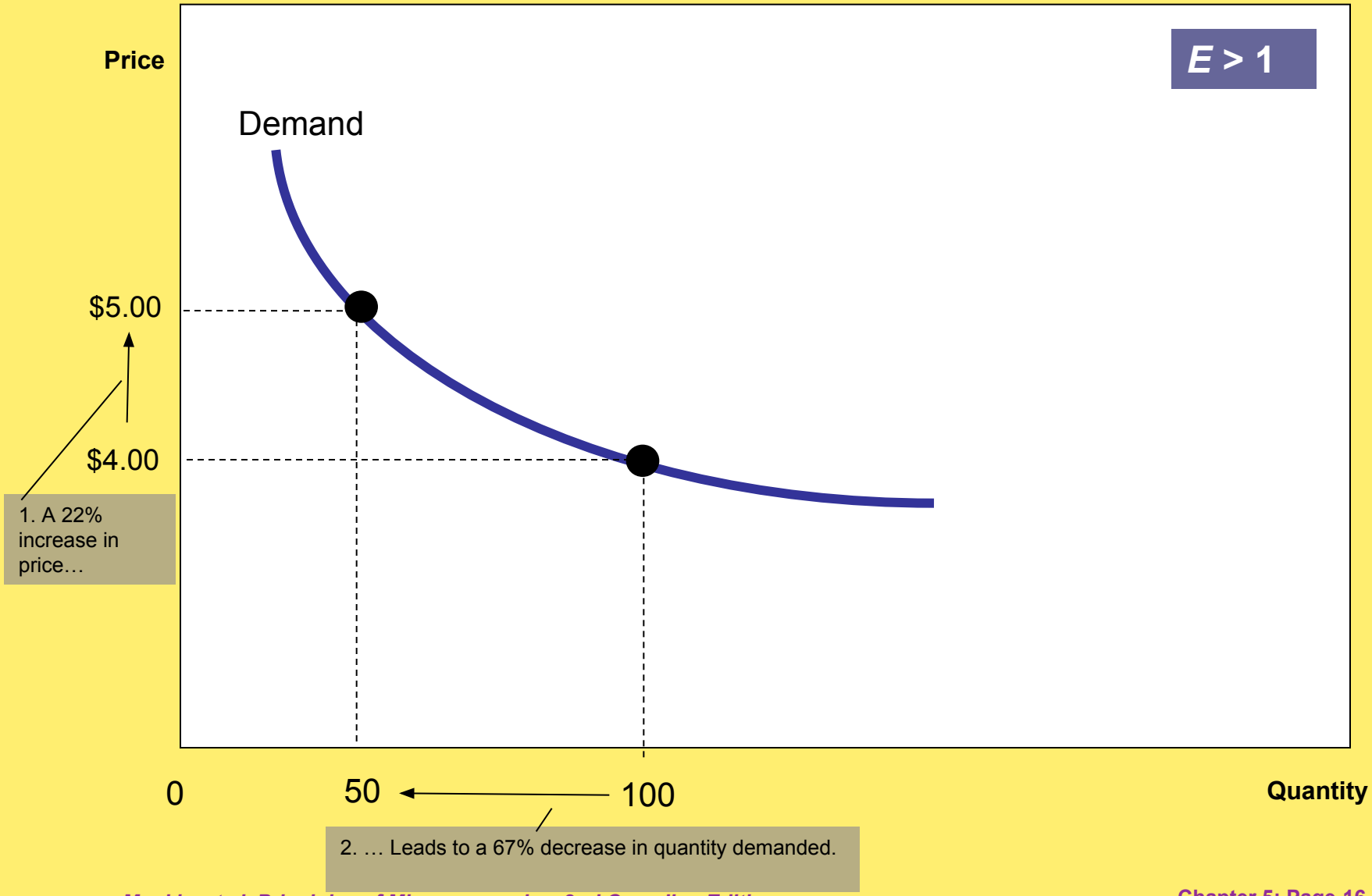
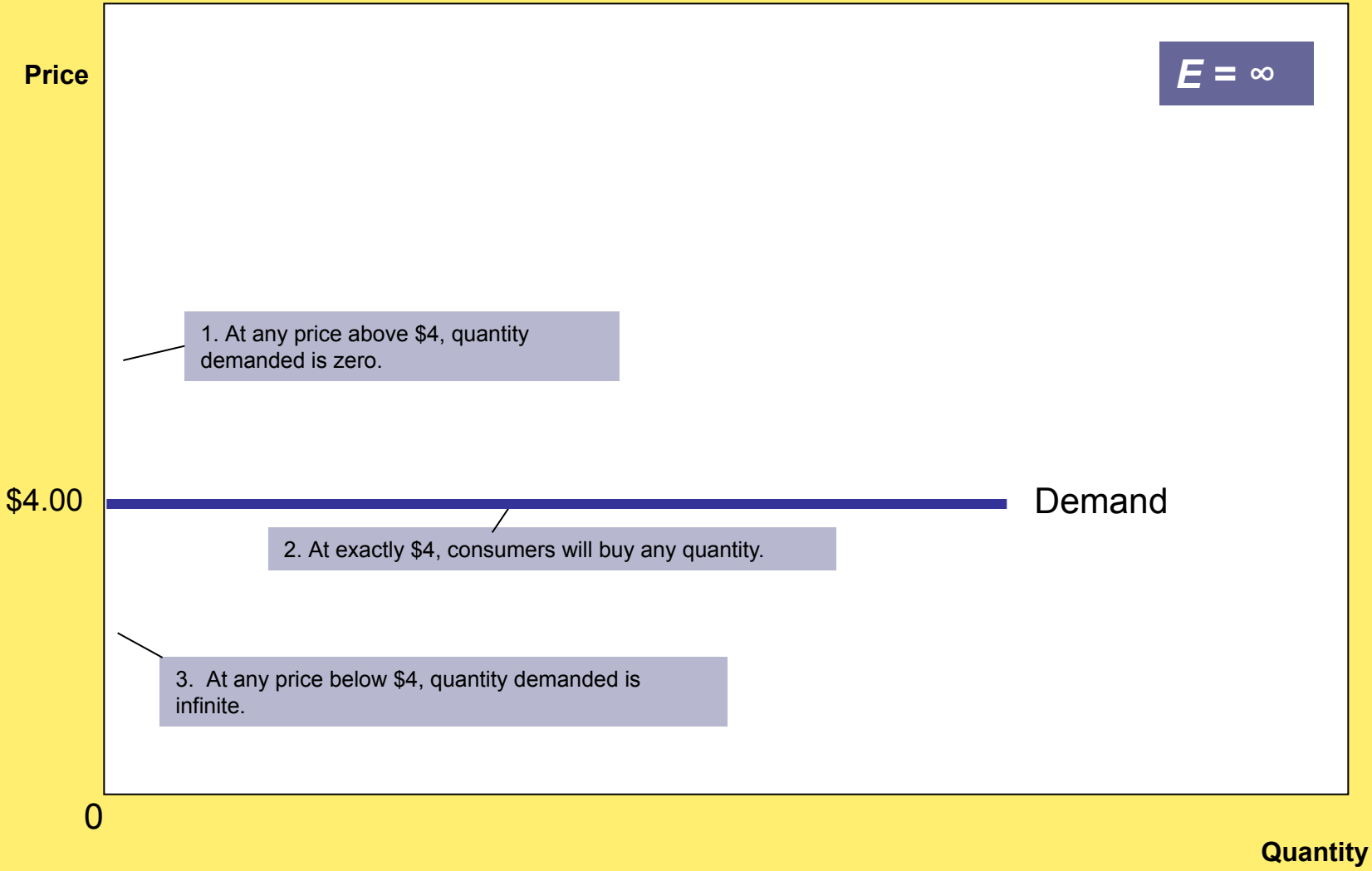


Figure 5-1 e): Perfectly Elastic Demand



Total Revenue and the Price Elasticity of Demand

- *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.

$$TR = P \times Q$$

Figure 5-2: Total Revenue

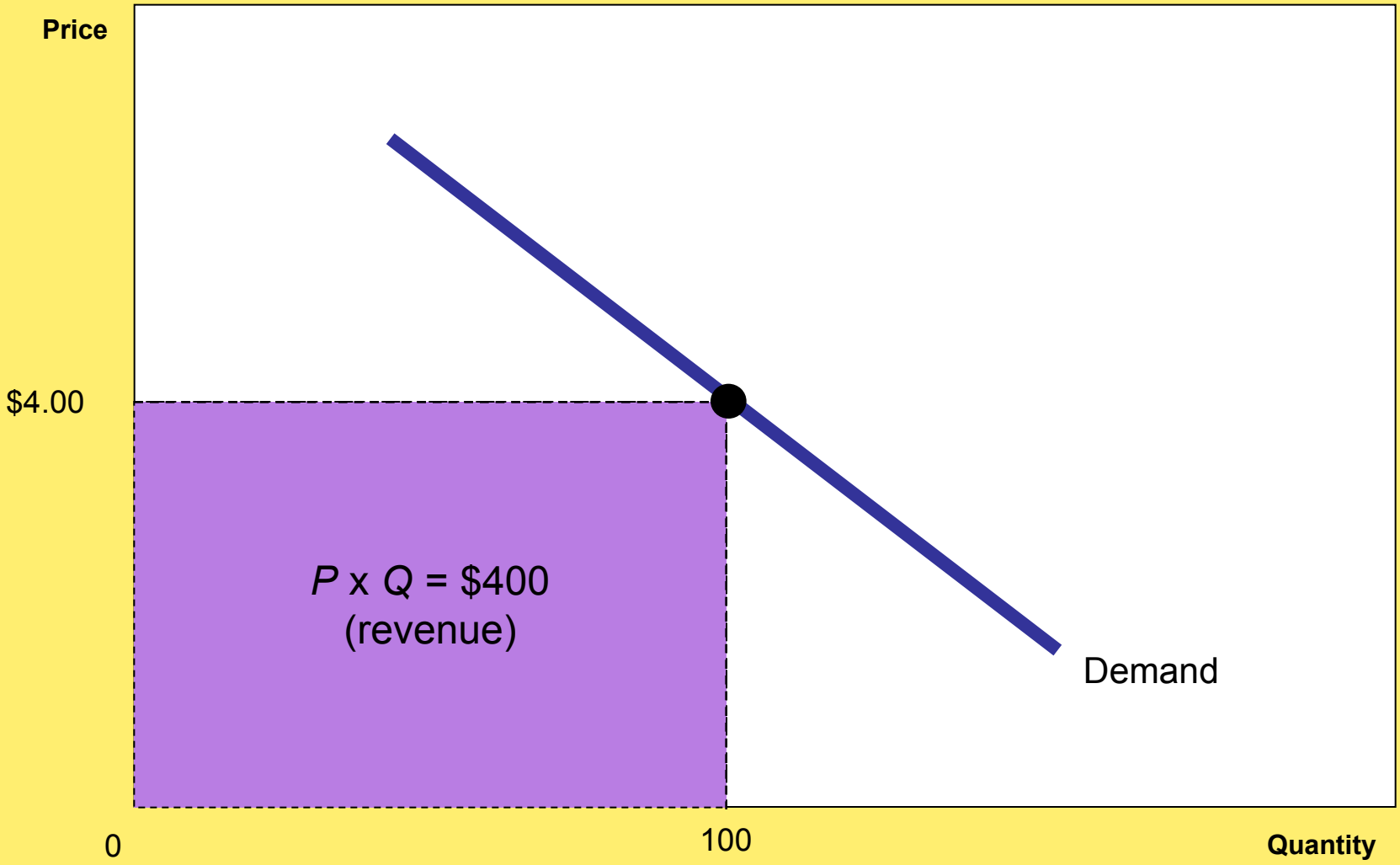


Figure 5-3: How Total Revenue Changes When Prices Changes: Inelastic Demand

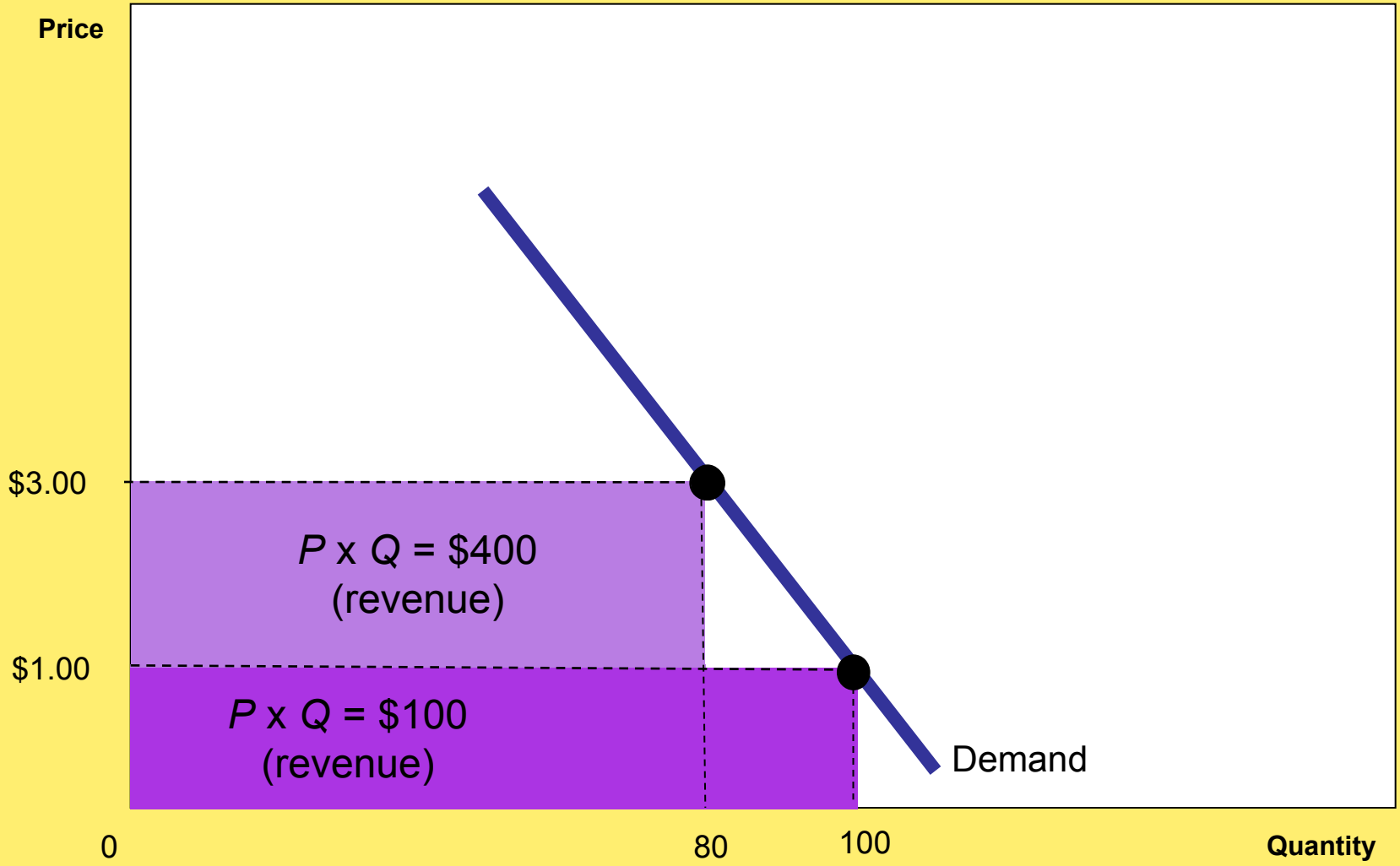
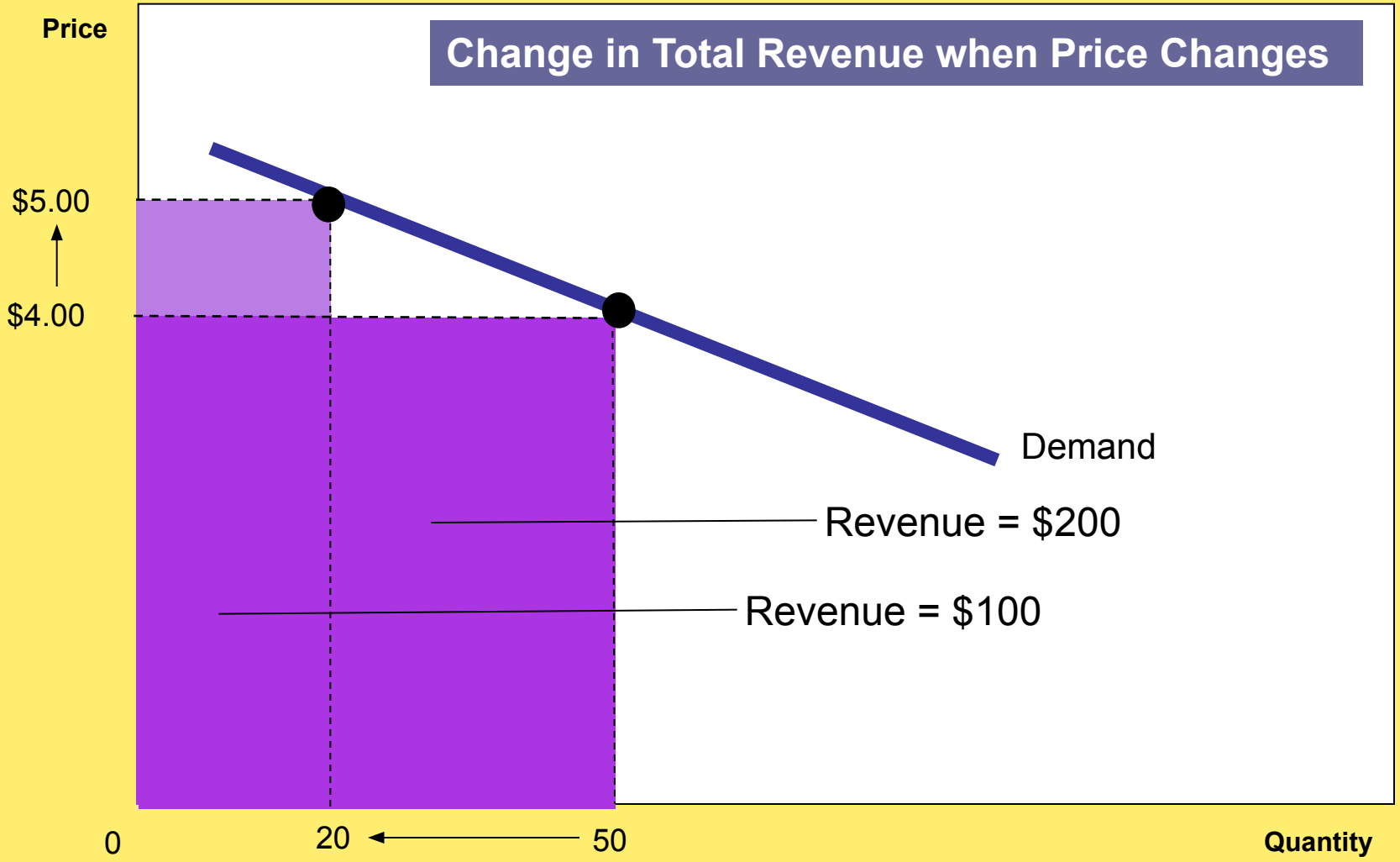


Figure 5-4: How Total Revenue Changes When Prices Changes: Elastic Demand



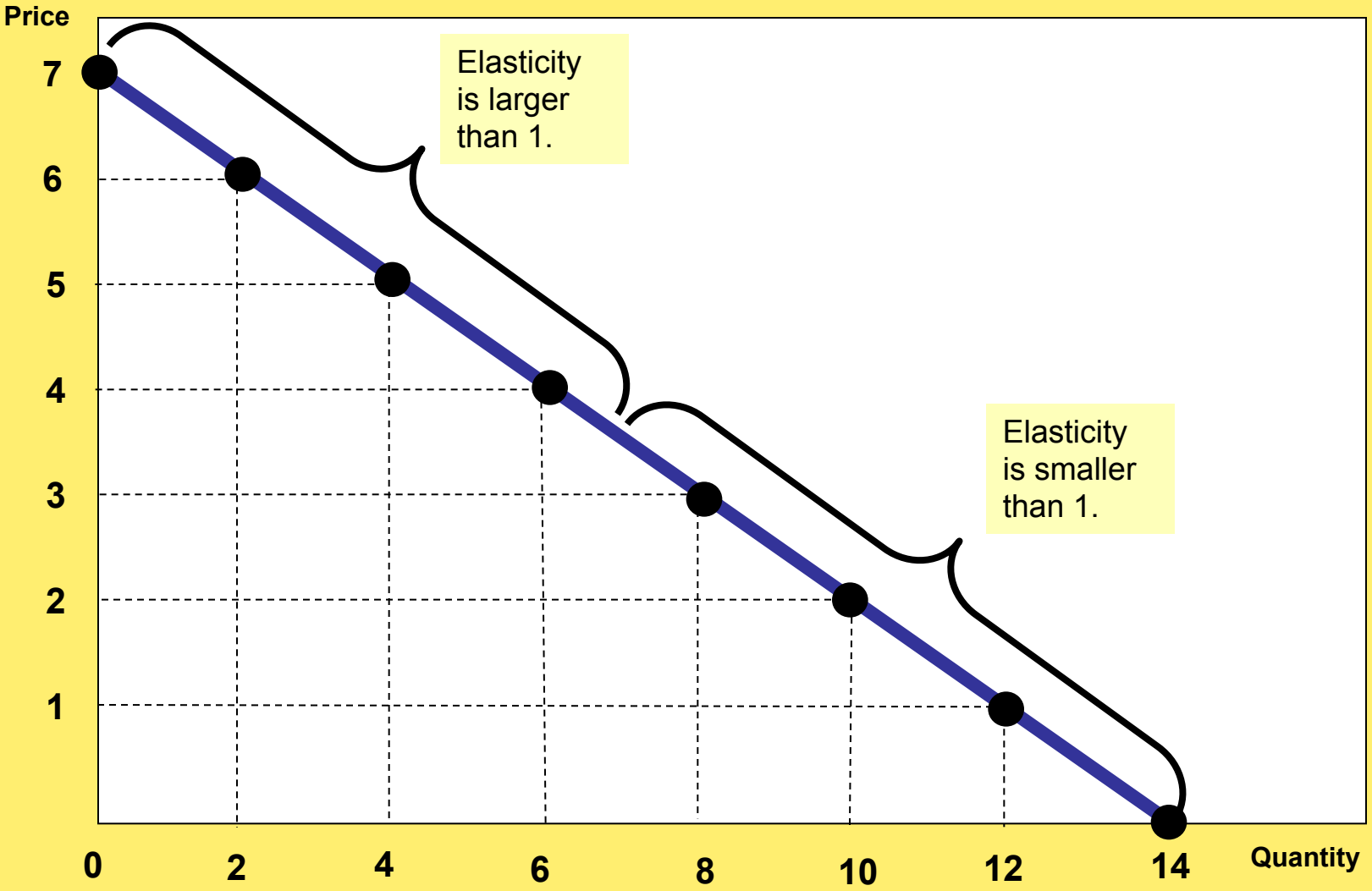
Elasticity and Total Revenue along a Linear Demand Curve

- 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.*

Table 5-1. Elasticity and Total Revenue along a Linear Demand Curve

Price	Quantity	Total Revenue (Price × Quantity)	Percent Change in Price	Percent Change in Quantity	Elasticity	Description
$7	0	$ 0				
			15	200	13.0	Elastic
6	2	12				
			18	67	3.7	Elastic
5	4	20				
			22	40	1.8	Elastic
4	6	24				
			29	29	1.0	Unit elastic
3	8	24				
			40	22	0.6	Inelastic
2	10	20				
			67	18	0.3	Inelastic
1	12	12				
			200	15	0.1	Inelastic
0	14	0				

Figure 5-5: A Linear Demand Curve



Other Demand Elasticities

- ***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.**

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

Other Demand Elasticities

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

Other Demand Elasticities

- 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.

Other Demand Elasticities

- ***Cross-Price elasticity of demand*** **measures how much the quantity demanded of a good responds to a change in the price of another good.**
- **It is computed as the percentage change in the quantity demanded divided by the percentage change in the price of the second good.**

Cross Price elasticity of demand = $\frac{\text{Percentage change in quantity demanded}}{\text{Percentage change in the price of good 2.}}$

PRICE 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 given a percent change in the price.**

The Price Elasticity of Supply and Its Determinants

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

Computing the Price Elasticity of Supply

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

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

Computing the Price Elasticity of Supply

- Suppose an increase in the price of milk from $1.90 to $2.10 a litre raises the amount that dairy farmers produce from 9000 to 11 000 L per month…

- … using the midpoint method, we calculate the percent change in the price as (2.10 - 1.90) / 2.00 x 100 = 10%
- Similarly, we calculate the percent change in the quantity supplied as (11 000 - 9000) / 10 000 x 100 = 20%

$$\text{Price elasticity of supply} = \frac{20\%}{10\%} = 2.0$$

Figure 5-6 a): Perfectly Inelastic Supply

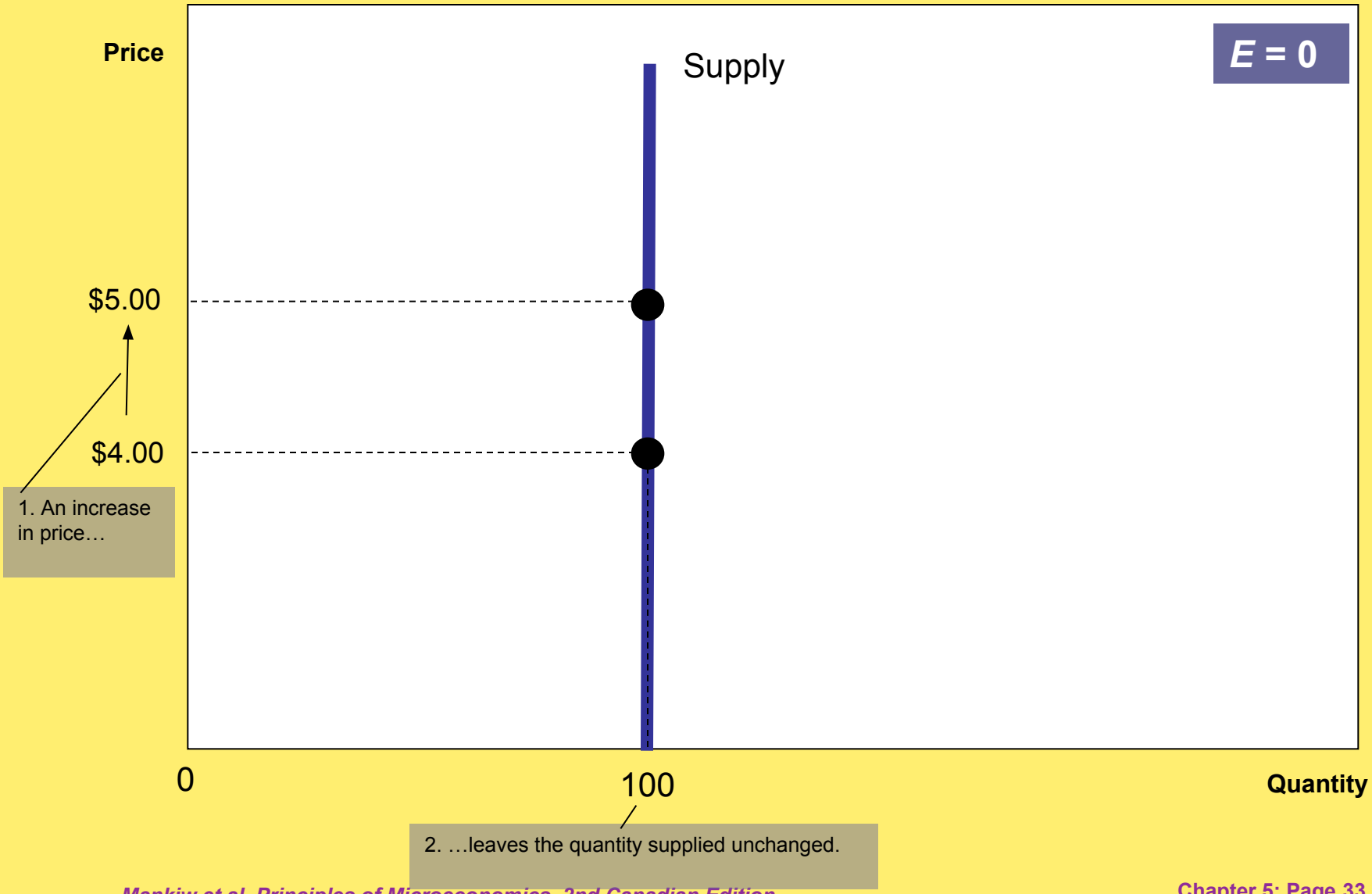


Figure 5-6 b): Inelastic Supply

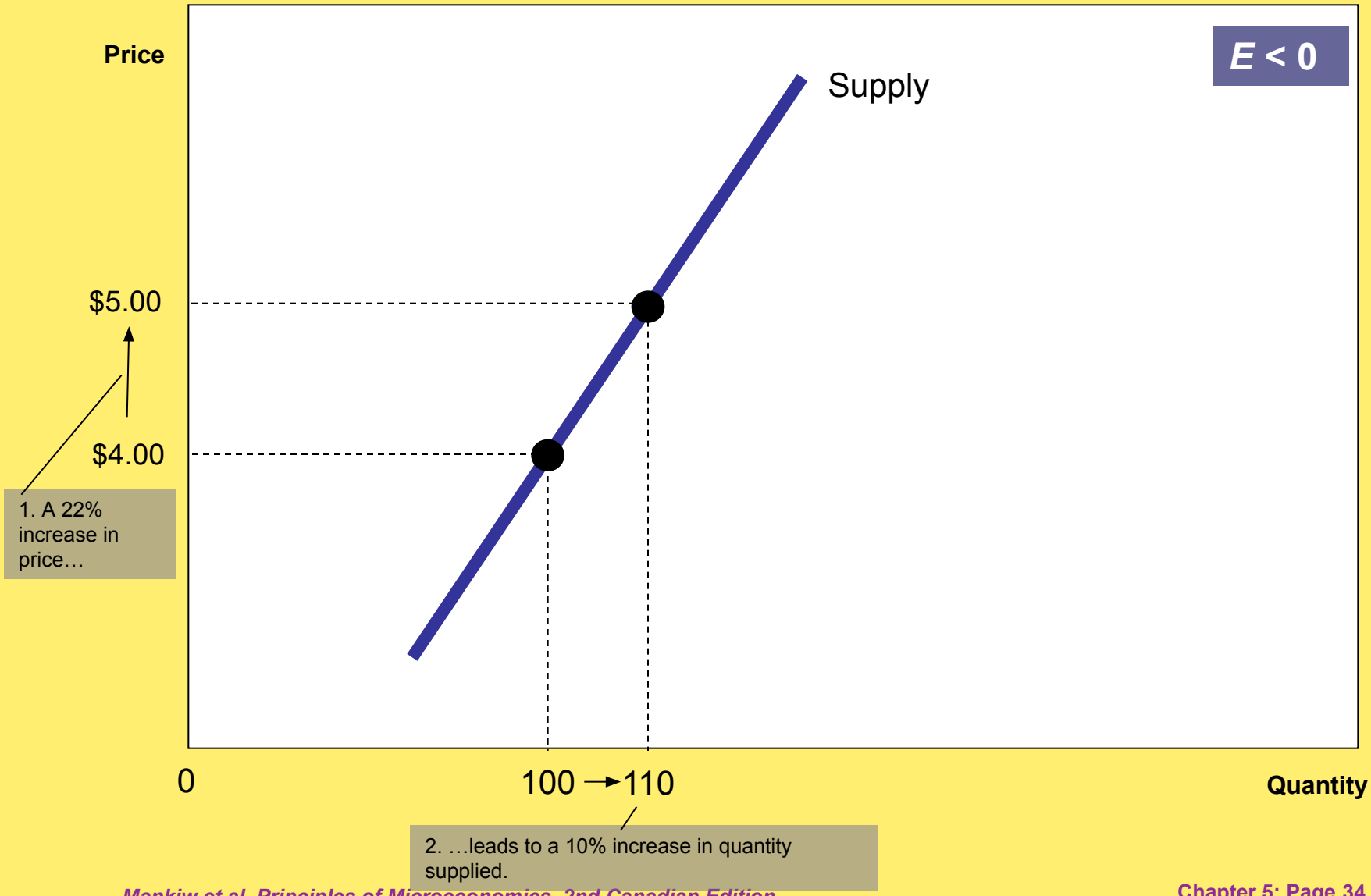


Figure 5-6 c): Unit Elastic Supply

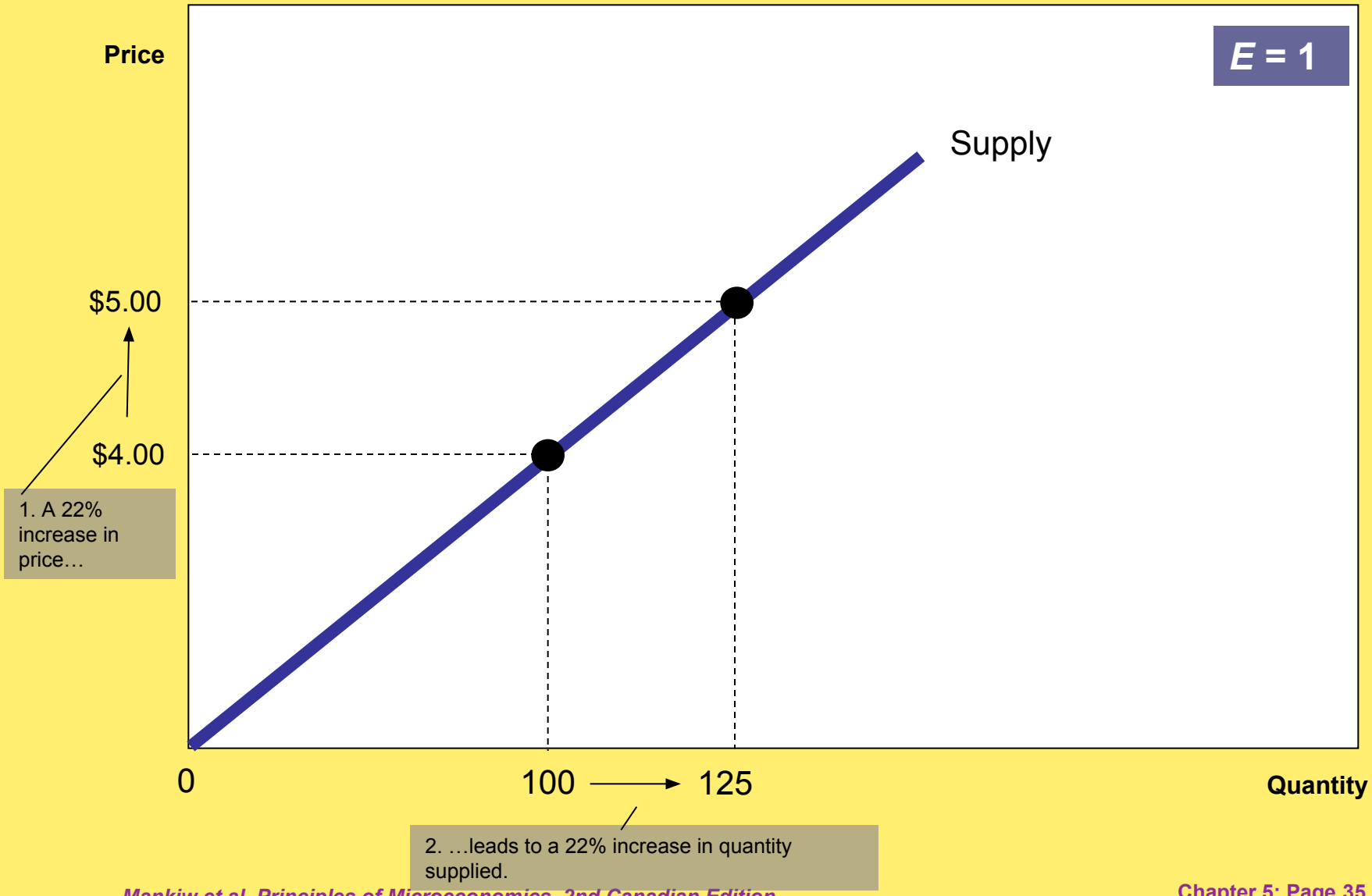


Figure 5-6 d): Elastic Supply

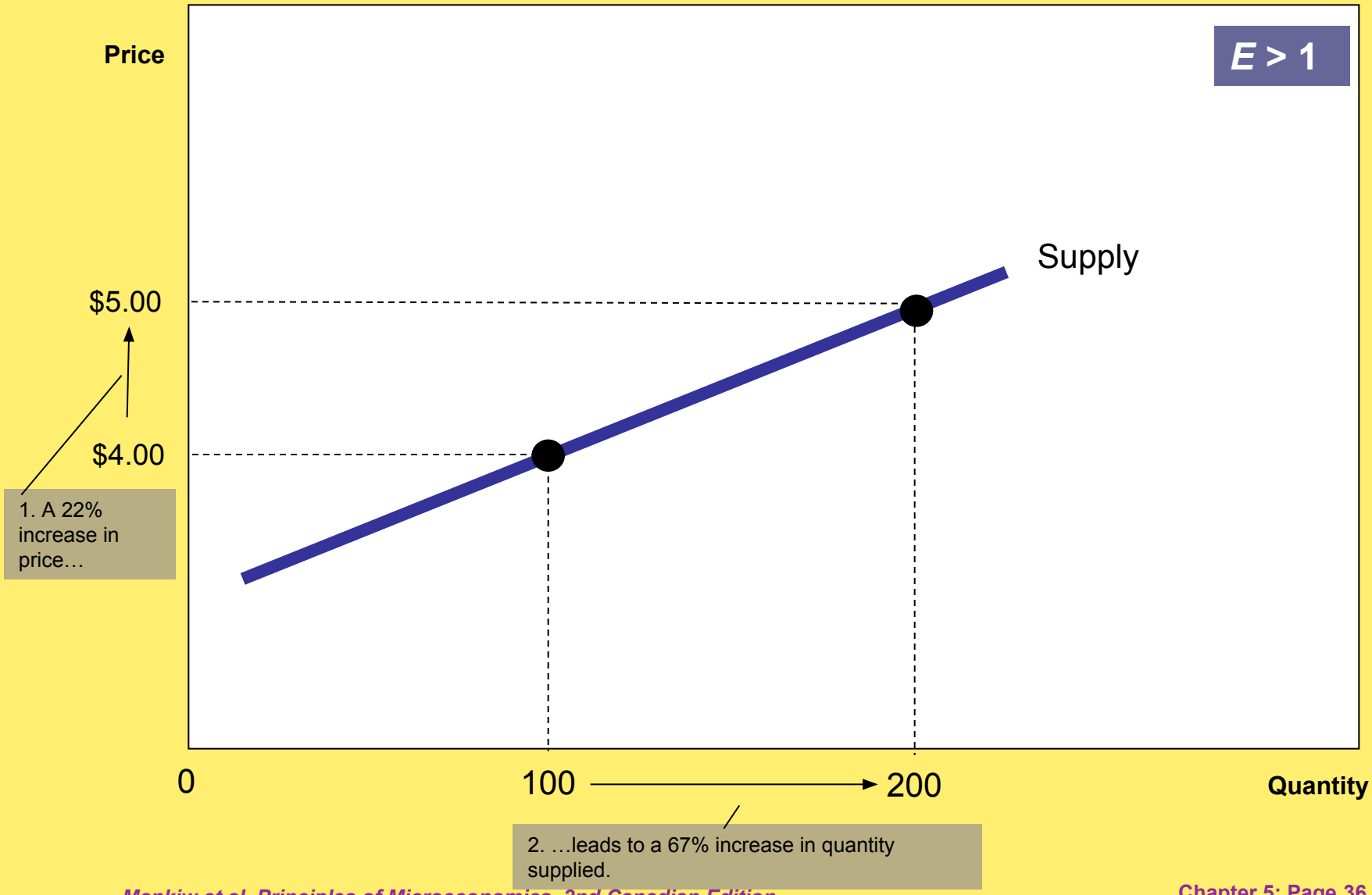
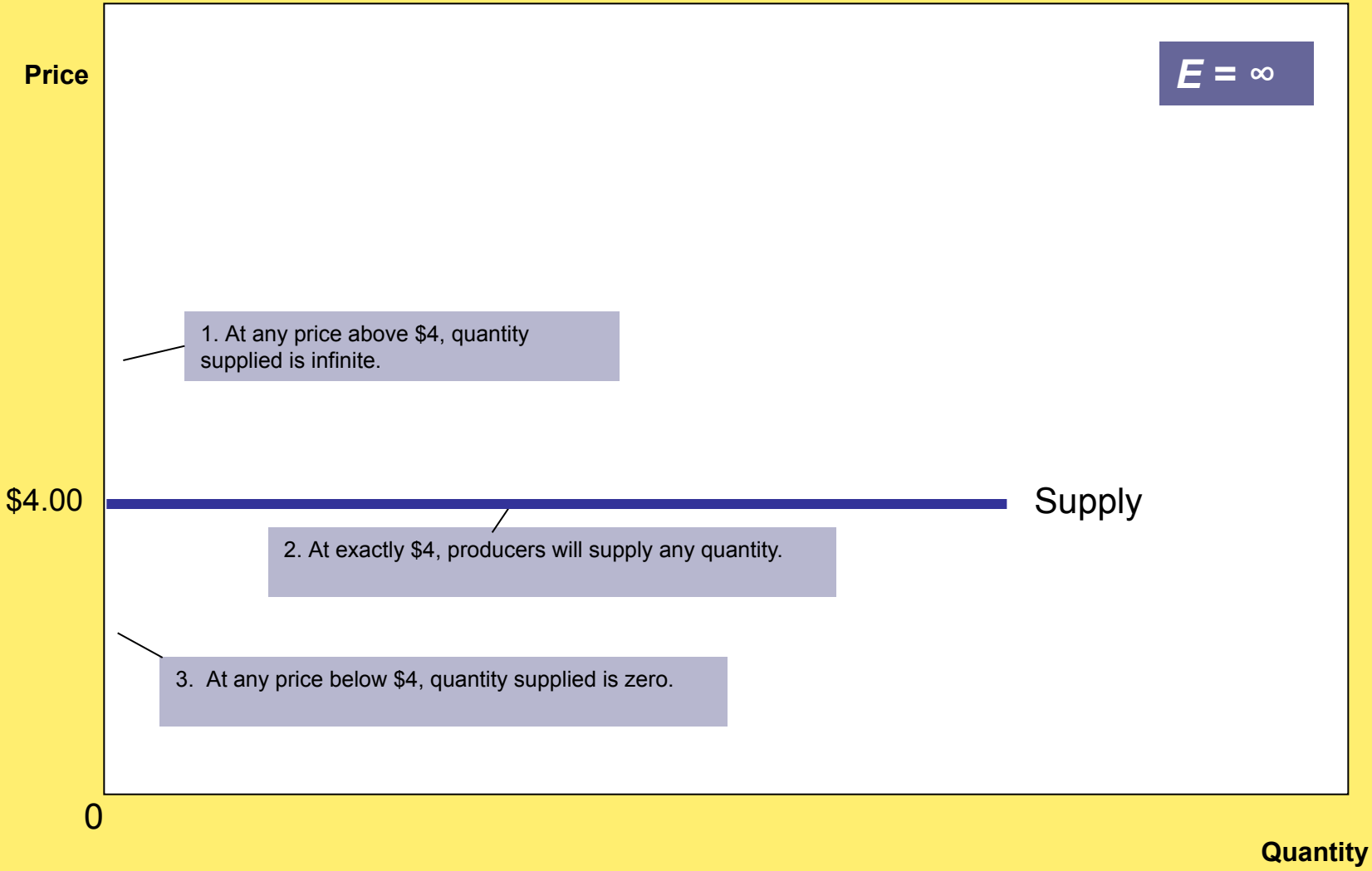


Figure 5-6 e): Perfectly Elastic Supply



Summary

- 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

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

Summary

- 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 End