Elasticity and Its Application

Elasticity . . .

◆ … is a measure of how much buyers and sellers respond to changes in market conditions

◆ … allows us to analyze supply and demand with greater precision.

◆Journal Question-Name 3 necessities and 3 luxuries that you would buy.

Price Elasticity of Demand

◆ **Price elasticity of demand** is the percentage change in quantity demanded given a percent change in the price.

◆ It is a measure of how much the quantity demanded of a good responds to a change in the price of that good.

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.

Price Elasticity =   Percentage Change in Qd

Of Demand   Percentage Change in Price

Elasticity, Percentage Change and Slope

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.

But instead of looking at unit change, elasticity looks at percentage change. What do we mean by percentage change?

Brief Assessment on Percentages

- **If there are 50 tomatoes in a store and you picked 16 of them, what percentage of the total did you pick?**

- **Paul used to weigh 200 lbs last year, but now he only weighs 175 lbs. How many lbs did he lose? What is the percent change of the loss?**

- **What is the average of 300 and 330? What is the midpoint?**

Computing the Price Elasticity of Demand

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

Example: If the price of an ice cream cone increases from $2.00 to $2.20 and the amount you buy falls from 10 to 8 cones then your elasticity of demand would be calculated as:

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

Computing the Price Elasticity of Demand Using the Midpoint Formula

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.

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

Computing the Price Elasticity of Demand

Price Elasticity of Demand $= \dfrac{(Q_2 - Q_1)/[(Q_2 + Q_1)/2]}{(P_2 - P_1)/[(P_2 + P_1)/2]}$

Example: If the price of an ice cream cone increases from \$2.00 to \$2.20 and the amount you buy falls from 10 to 8 cones the your elasticity of demand, using the midpoint formula, would be calculated as:

$$\frac{\dfrac{(10-8)}{(10+8)/2}}{\dfrac{(2.20-2.00)}{(2.00+2.20)/2}} = \frac{22\ percent}{9.5\ percent} = 2.32$$
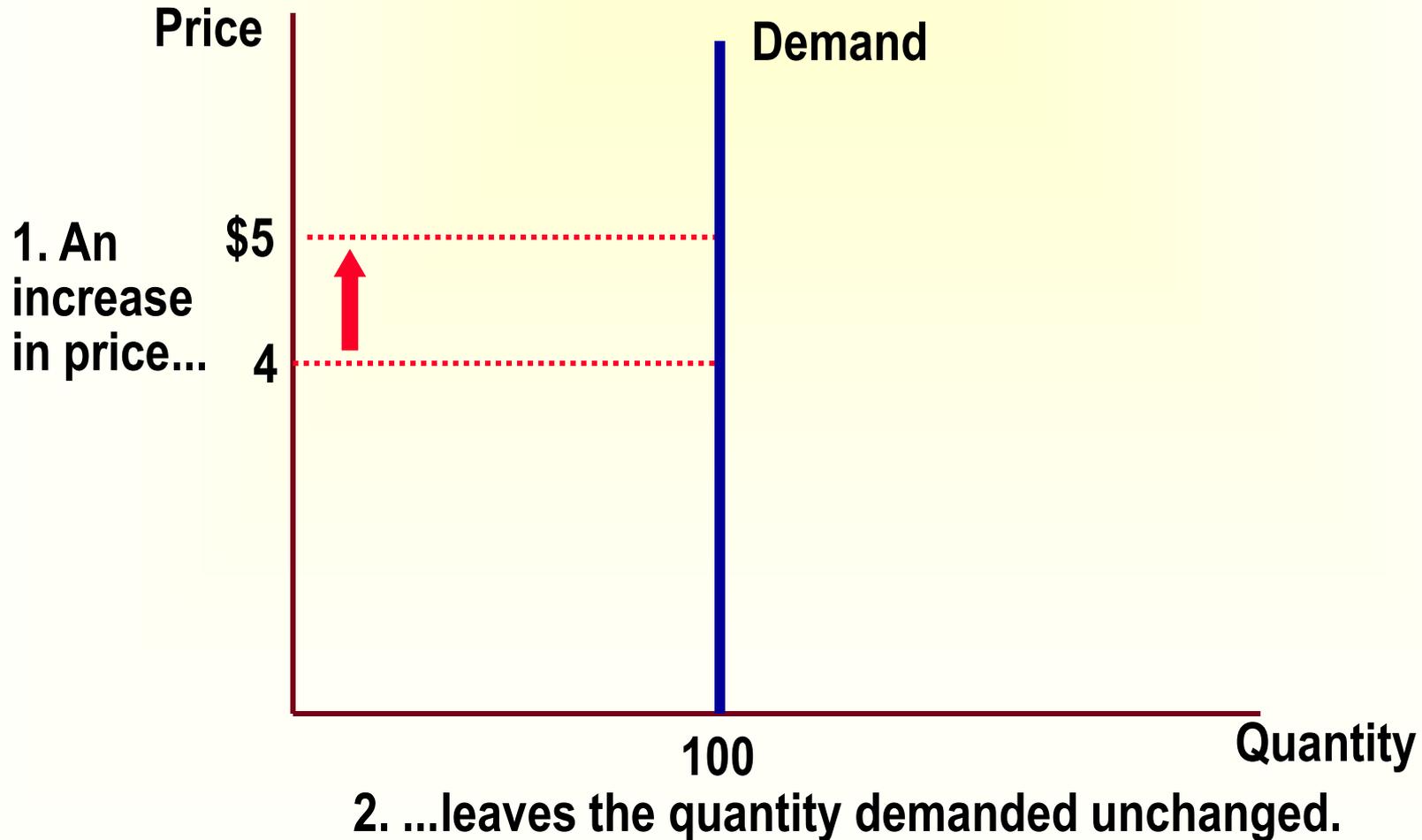
Ranges of Elasticity

Inelastic Demand

◆ Percentage change in price is greater than percentage change in quantity demand.

◆ Price elasticity of demand is *less than* one.

Elastic Demand

◆ Percentage change in quantity demand is greater than percentage change in price.
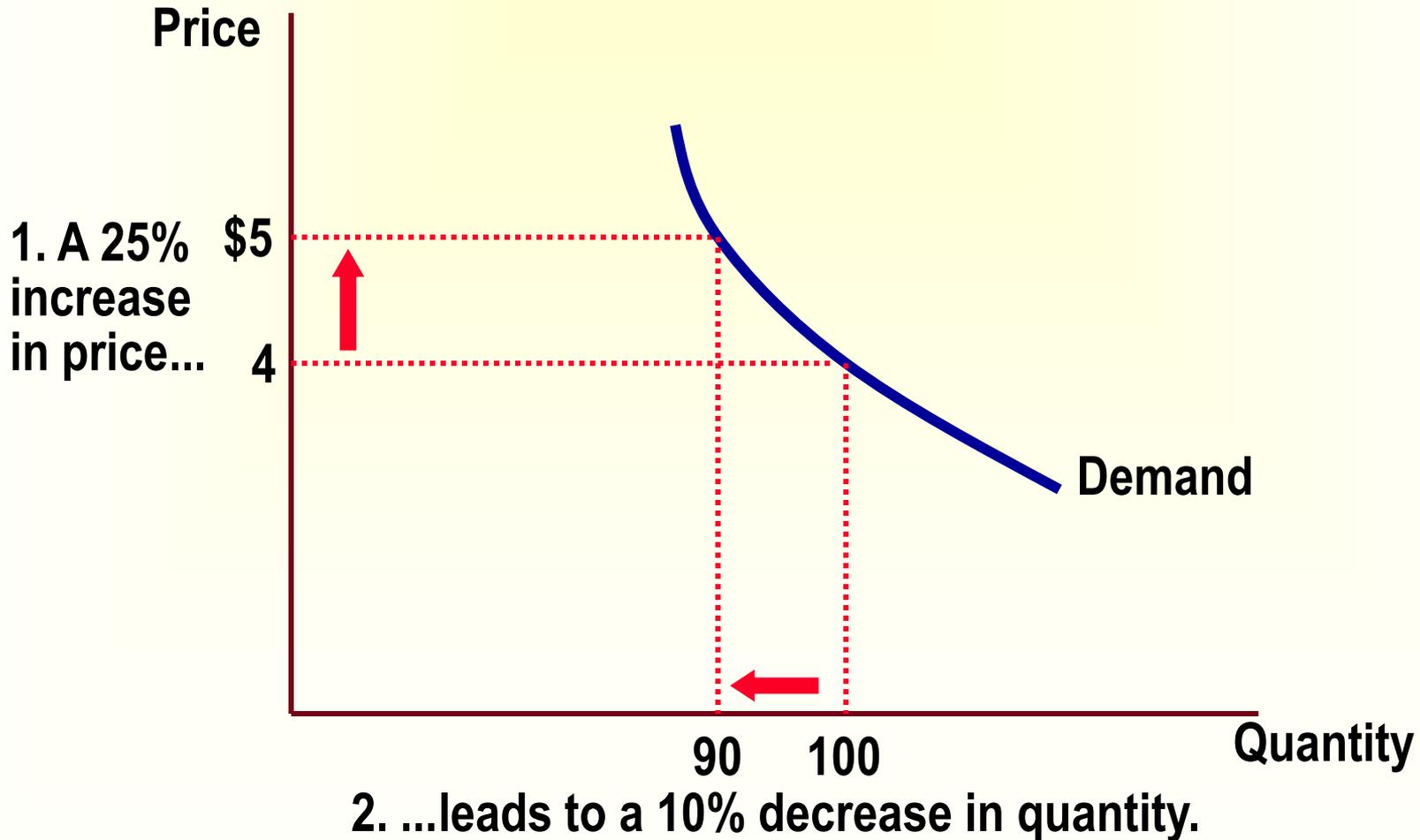
◆ Price elasticity of demand is *greater than* one.
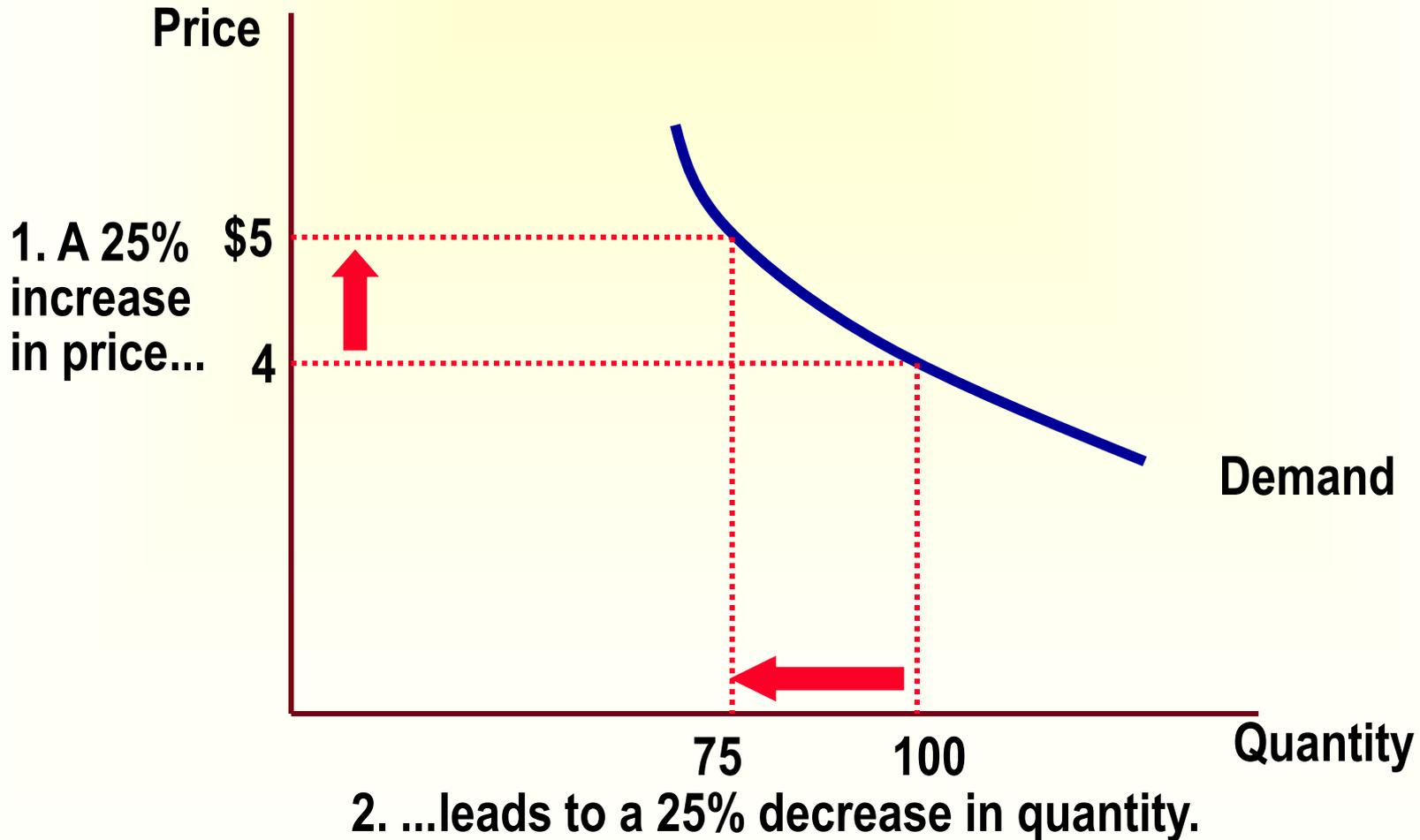
Perfectly Inelastic Demand
- Elasticity equals 0

Price

Demand

$5

4

1. An increase in price...

100

Quantity

2. ...leaves the quantity demanded unchanged.

Inelastic Demand
- Elasticity is less than 1

Price

1. A 25% increase in price...

$5

4

Demand

90   **100**

Quantity

2. ...leads to a 10% decrease in quantity.

Unit Elastic Demand
- Elasticity equals 1

Price

1. A 25% increase in price...

$5

4

Demand

75   100   Quantity

2. ...leads to a 25% decrease in quantity.

Elastic Demand
- Elasticity is greater than 1
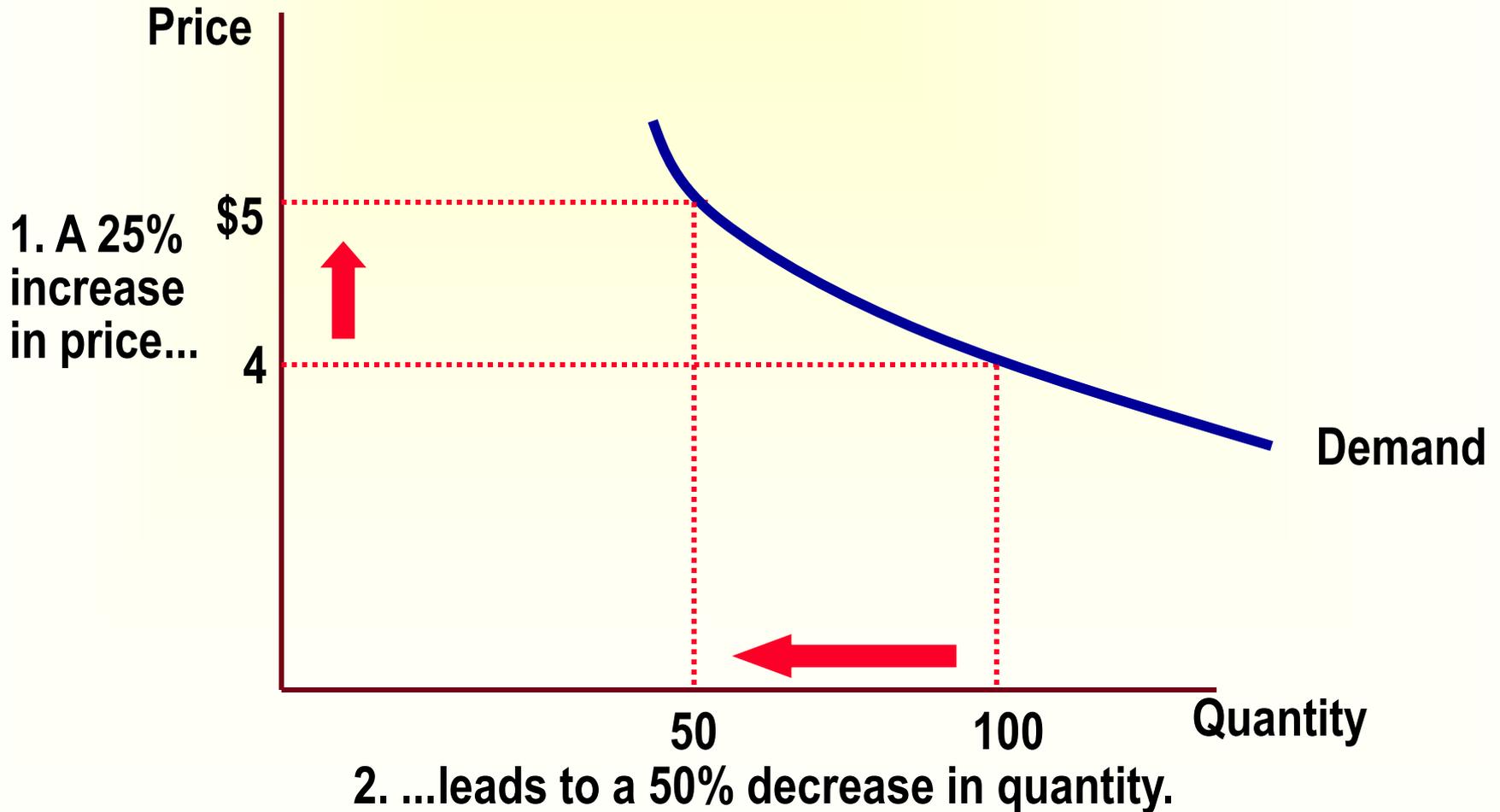
Perfectly Elastic Demand
- Elasticity equals infinity

Price

$4 ————————————————————— **Demand**

1. At any price above $4, quantity demanded is zero.

2. At exactly $4, consumers will buy any quantity.

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

Quantity
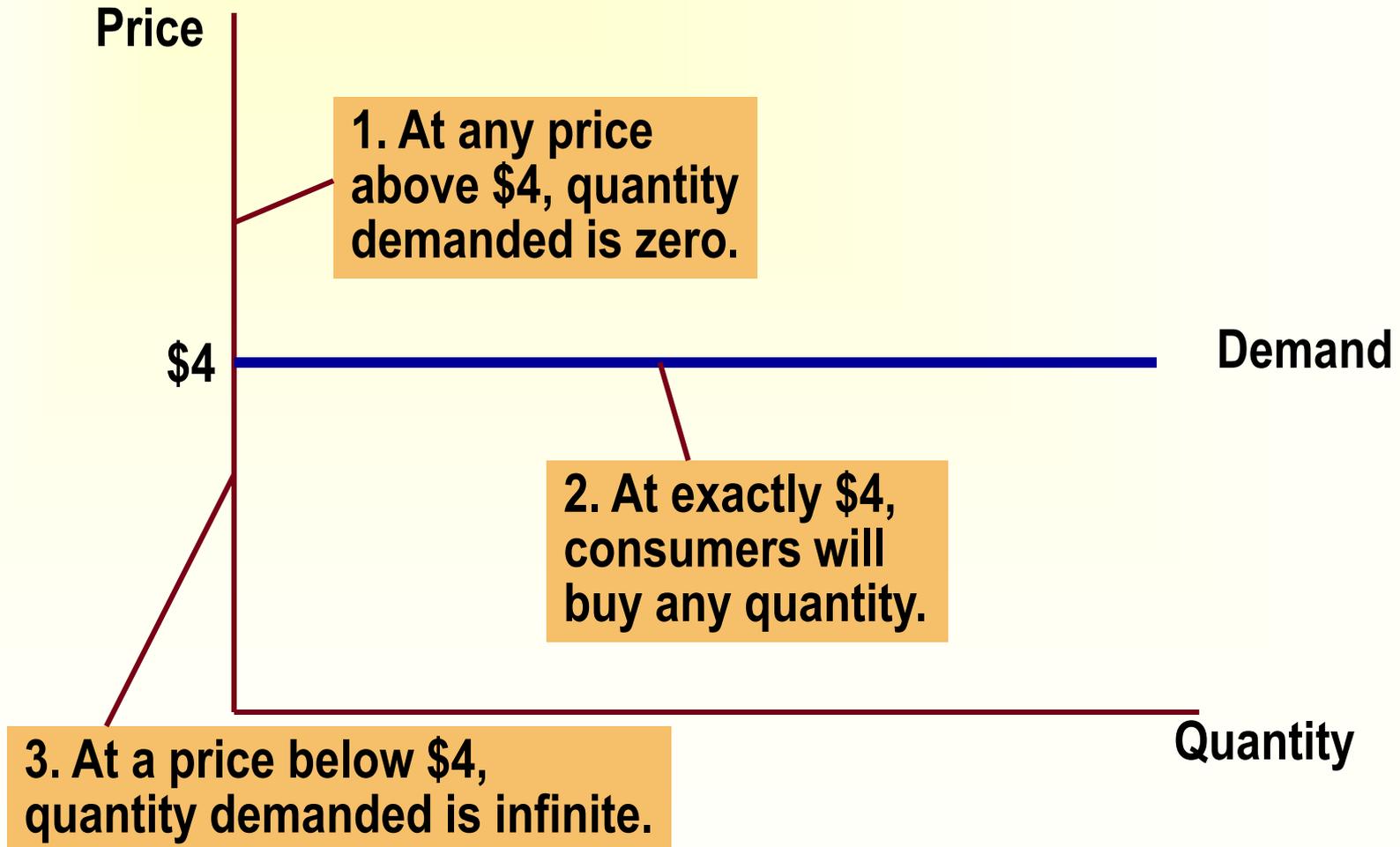
Determinants of
Price Elasticity of Demand

◆ *Necessities versus Luxuries*

◆ *Availability of Close Substitutes*

◆ *Definition of the Market*

◆ *Time Horizon*

Determinants of Price Elasticity of Demand

- **Demand tends to be more inelastic**
  - ↗**If the good is a necessity.**
  - ↗**If the time period is shorter.**
  - ↗**The smaller the number of close substitutes.**
  - ↗**The more broadly defined the market.**

Determinants of
Price Elasticity of Demand

## *Demand tends to be more elastic :*

◆ **if the good is a luxury.**

◆ **the longer the time period.**

◆ **the larger the number of close substitutes.**

◆ **the more narrowly defined the market.**

Elasticity and Total Revenue

◆ **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.

$$TR = P \times Q$$

Elasticity and Total Revenue

Price

$4

P

$P \ x \ Q = \$400$

(total revenue)

Demand

0   100   Quantity

Q
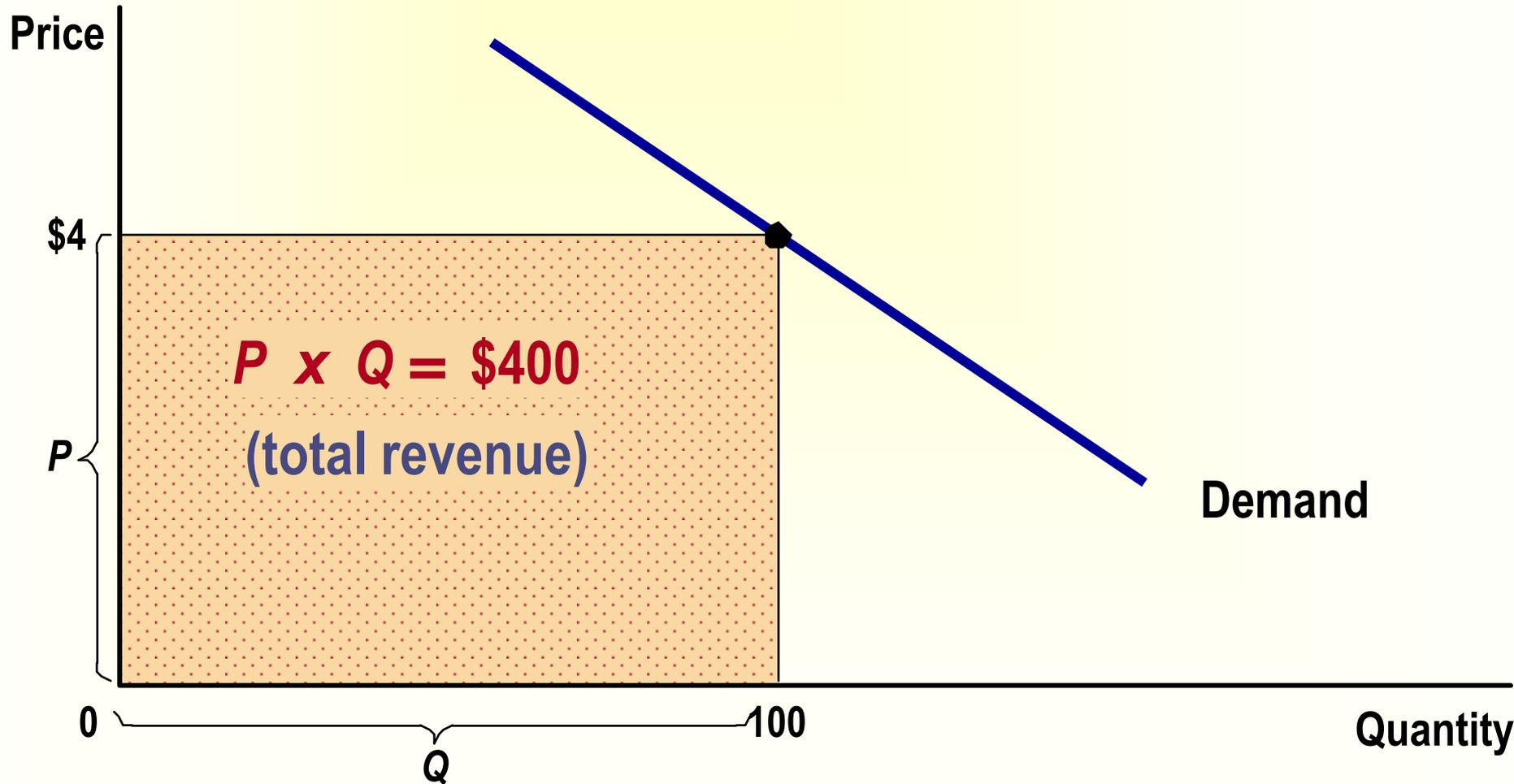
The Total Revenue Test for Elasticity

	Increase in Total Revenue	Decrease in Total Revenue
Increase in Price	**INELASTIC DEMAND**	**ELASTIC DEMAND**
Decrease in Price	**ELASTIC DEMAND**	**INELASTIC DEMAND**

An Example of an Inelastic Good

- **Oil and Oil Prices**
- **This video will show the supply side issues with getting oil out of the ground.**
- **Then the video will focus on the demand (us!) issues of using oil.**

Insert Economics Video File 1 and play Arab Oil clip.

Income Elasticity of 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.

Computing Income Elasticity

Income Elasticity of Demand $=$ $\dfrac{\text{Percentage Change in Quantity Demanded}}{\text{Percentage Change in Income}}$

Income Elasticity
- Types of Goods -

◆ *Normal Goods*
   ◆ Income Elasticity is positive.

◆ *Inferior Goods*
   ◆ Income Elasticity is negative.

◆ Higher income *raises* the quantity demanded for **normal goods** but *lowers* the quantity demanded for **inferior goods.**

Cross Price Elasticity of Demand

- **Elasticity measure that looks at the impact a change in the price of one good has on the demand of another good.**

- **% change in demand Q1/% change in price of Q2.**

- **Positive-Substitutes**

- **Negative-Complements.**