Topic 1: Demand and Supply

For an economist, the behaviour of demanders and suppliers of goods is motivated by economic _____ or incentives.

For example, consumers will modify their consumption patterns when there are changes in the _____, their **income** or their **perception** of a good. Producers will modify their production patterns when there is a change in _____ or technology.

❑The point is economists assume demanders and suppliers are ***r*_____**.

Example: Digital Camera Sales:

Digital cameras have become popular.

A few years ago, digital cameras were expensive relative to what they are presently.

High prices motivated (1) suppliers to increase _____
(2) new suppliers to ____ the market

As supply increased, price began to fall due to increased competition.

❑Lower prices motivated consumers to increase the quantity of cameras demanded.

The Market Demand Function:

Dick's Demand Schedule for the consumption of coffee per day:

Price per cup ($)	Cups Demanded per day
0.25	
0.50	
0.75	
1.00	
1.25	

This is Dick's individual demand function for coffee consumption.

Susan's Demand Schedule for the consumption of coffee per day:

Price per cup ($)	Cups Demanded per day
0.25	
0.50	
0.75	
1.00	
1.25	

This is Susan's individual demand function for coffee consumption.

Other consumers have individual demand functions for the coffee. Adding up the individual quantities demanded by all individual at each price results in the **m_____ demand function**.

"The market demand function expresses the relationship between the total _____ demanded and the _____ of the product per unit of time, other things remaining the same."

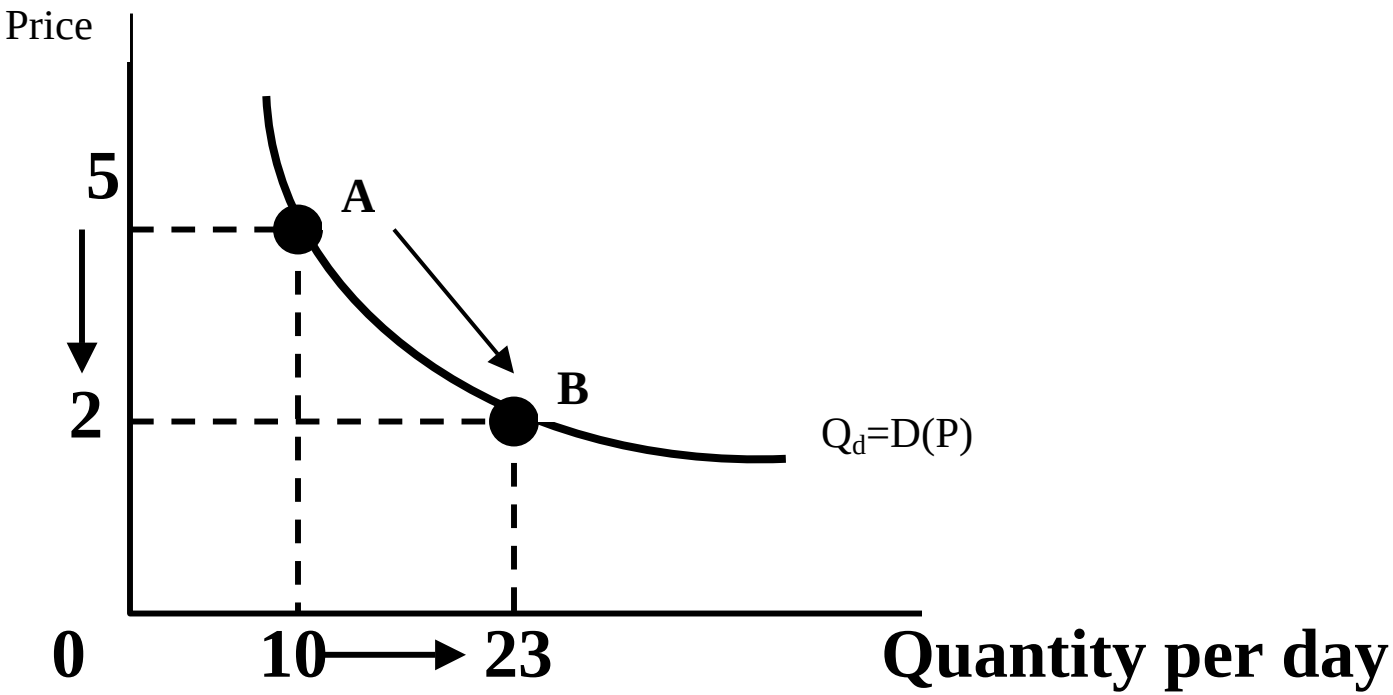
Notation: this relationship between price and aggregate quantity demanded is expressed as:

$$\mathbf{Q_d = D(P)} \qquad (1\text{-}1)$$

Q_d = quantity demanded
P= price per unit
'D' is represents the demand ***function.***

❑**Prices along the demand function represent the _____ amounts buyers will pay.**

Movement Along A Demand Function:



- Generally, total quantity _____ increases when the price of the good decreases.
- This can be illustrated graphically as a _____ along the demand function.

- A movement along a demand function always involves a change in the _____ of the good and a change in the total q_____ demanded of that good.

This relationship between _____ and the quantity demanded is called the **Law of _____.**

- The increase in the quantity demanded is due to increased consumption by current consumers and new consumers.

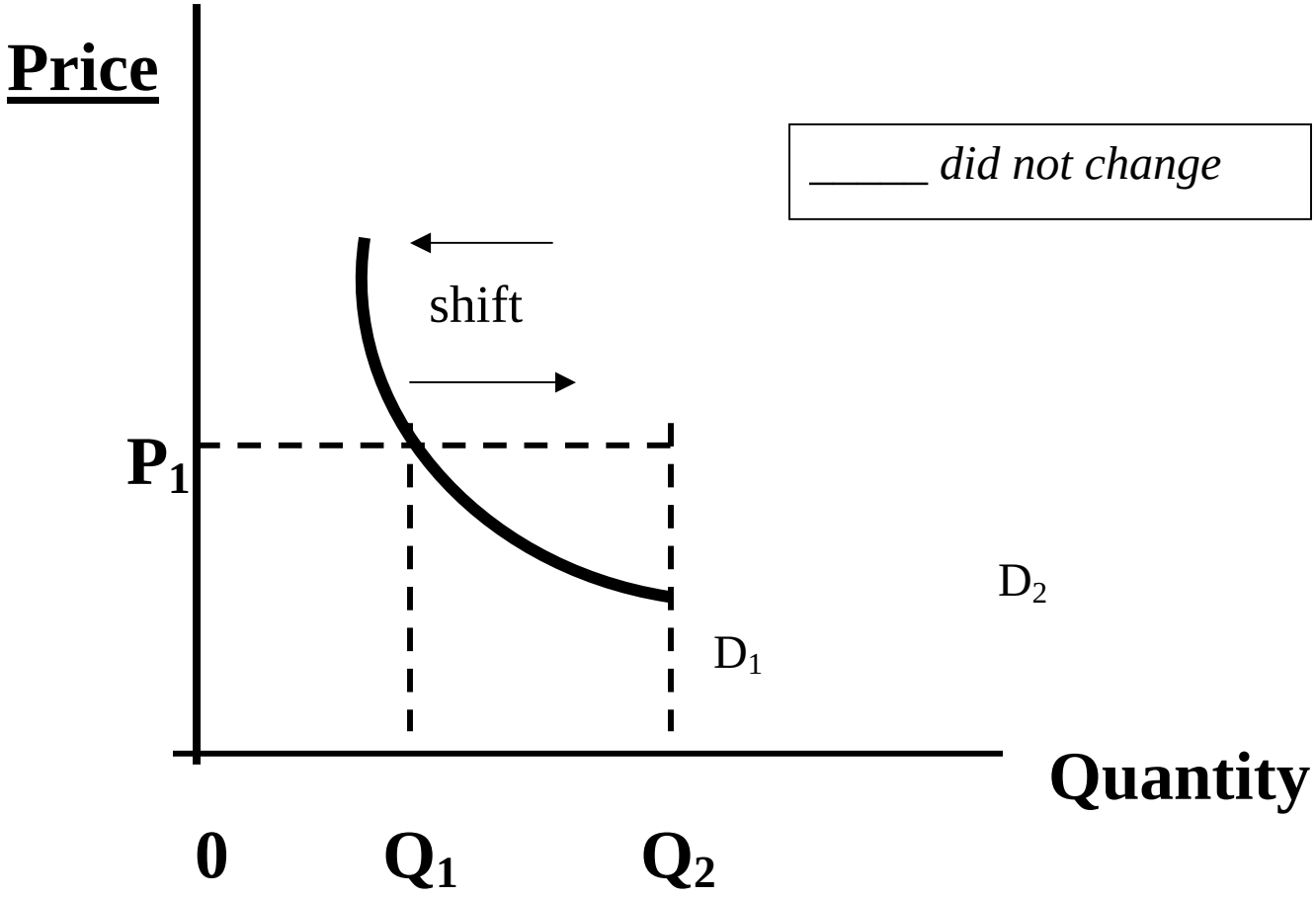
Shifts in The Demand Function

Price is not the only variable that determines the total quantity demanded of a good.

However, changes in any determinant _____ than price cause the demand function to **s____**.

Such **shifts** are due to changes in:

- consumer _____
- the prices of _____ goods - substitutes or complements
- tastes or preferences of consumers



At each price, the quantity demanded increases.

Market Supply Function

The **market supply function** represents the total quantity supplied at each _____ by all producers in the market per unit of time, everything else remaining the same.

⇨The quantity supplied is not _____ by the production capabilities of the firm.

Rather a **higher price** induces the suppliers to increase production and therefore increase supply.

“The supply function expresses the relationship between the total _____ supplied and the _____ received by all suppliers per unit of time, holding other factors constant.”

Notation:

Q_s=S(P) ← Market Supply Function

where:

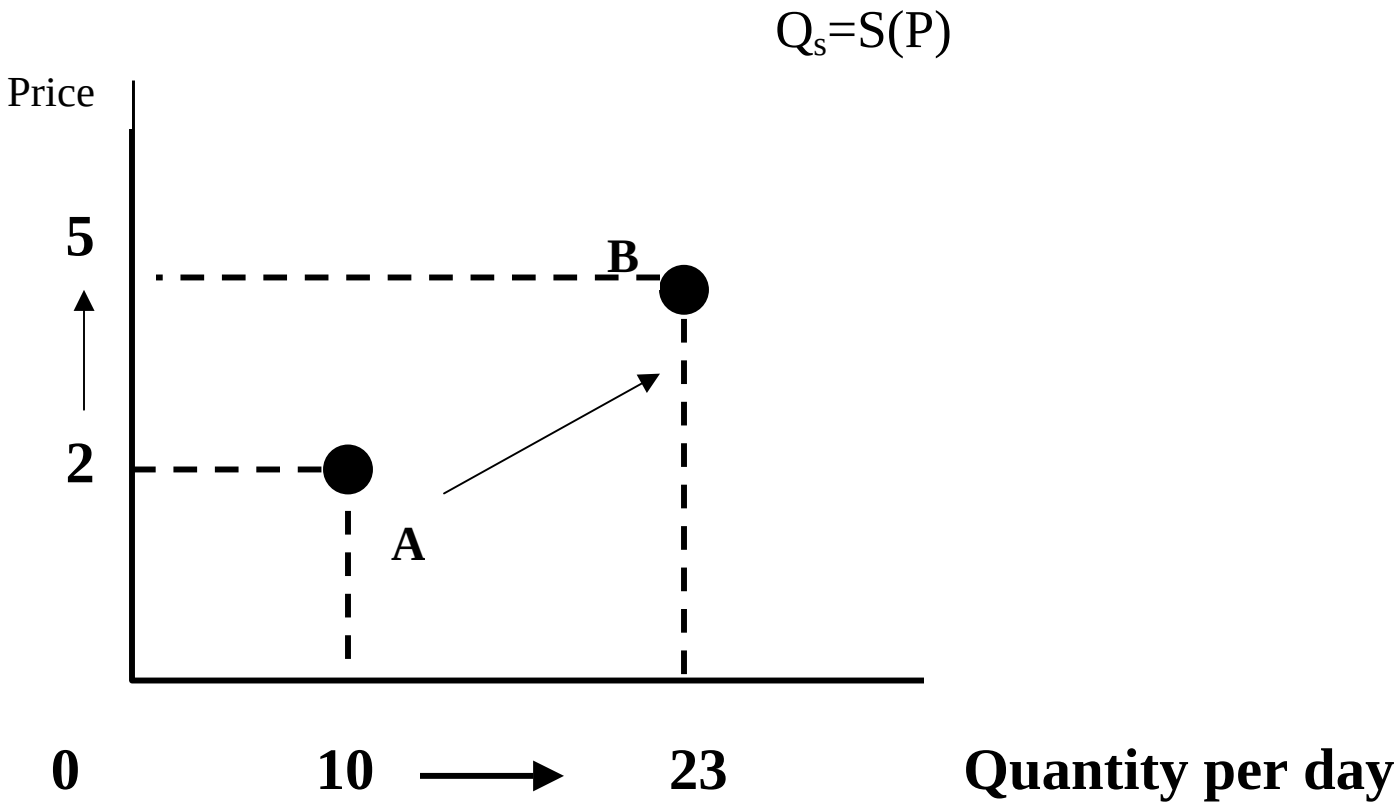
P = price that producers receive

Q_s = total quantity supplied by all producers.

Recall, the market demand function shows how consumers respond to changes in price.

❑The market supply function illustrates how suppliers react to _____ changes.

Movements Along the Supply Function



The diagram shows that suppliers will produce quantity Q_1 units of a good if the price they receive is P_1.

If suppliers can receive P_2, they will supply Q_2 units.

Changes in ____ and resulting quantity of the goods supplied result in a **m_____** along the supply function.

Changes in ____ and resulting quantity of the goods supplied result in a **m_____** along the supply function.

❑The slope of the supply curve is generally **positive** because the total amount supplied will increase as prices increase due to the fact that:

(1) established suppliers will produce larger _____ of the good at a higher price. (profit motive)

(2) new firms enter the market when the price is higher.

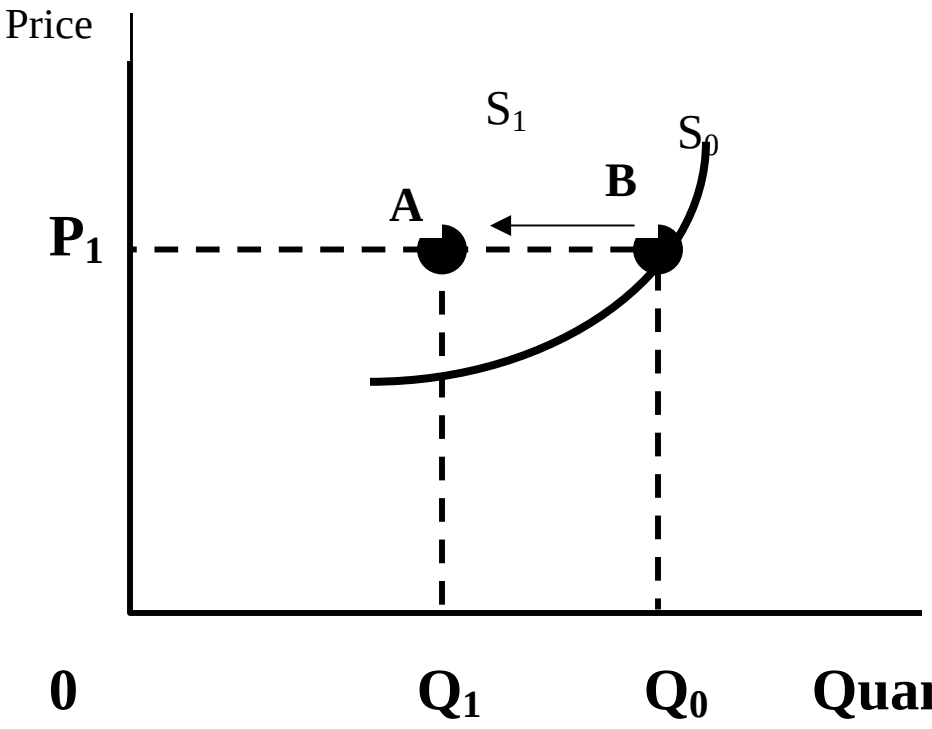
Shifts In the Supply Function

The supply function **shifts** due to a change in:

(1) **production costs such as _____ costs**:

- ⇨ Natural resources
- ⇨ Labour costs (wages)
- ⇨ Capital costs

(2) **t_____**



Wages rise; it is more expensive to produce;
produce less: Q_1

Example: Wages rise ⟶ more expensive to produce ⟶ produce less ⟶ Q_1.

Example: Shift in government regulation

Summary:

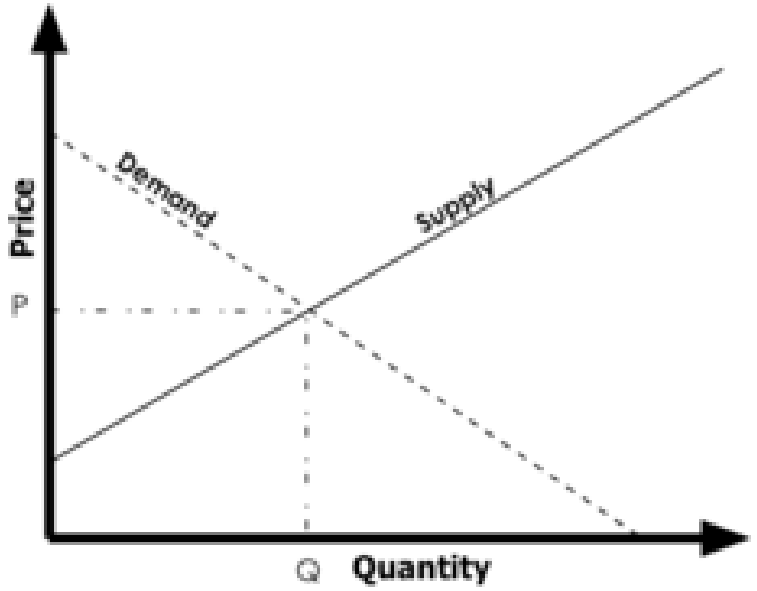
- Quantity supplied increases when the _____ received by suppliers increases.

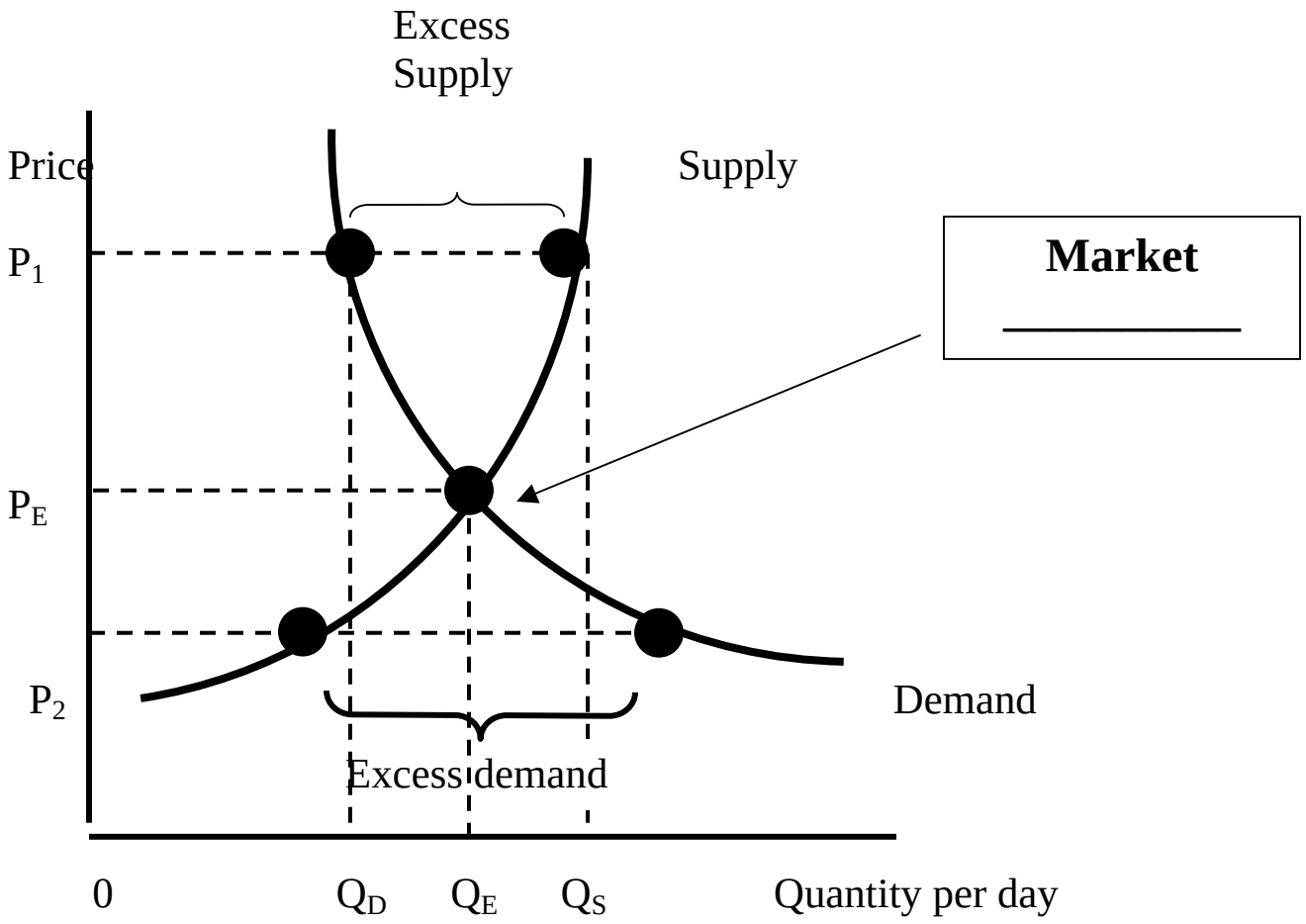
- Supply function _____ due to a change in input cost or change in technology.

Market Equilibrium

In a _____ ***market*** there is only one point where quantity demanded **equals** quantity supplied.

"A market equilibrium exists when the quantity demanded equals the quantity supplied."





- P_E is the only _____ where the total quantity demanded equals the total quantity supplied.

- At P_E, the quantity demanded and supplied equals Q_E, where P_E is the equilibrium price and Q_E is the equilibrium quantity.

- At any other price, the quantity demanded and the quantity supplied will **not** be _____.

- If price is above P_E, there will be excess _____ leading to surplus inventory.

- As producers decrease their price to move this excess, suppliers will produce less and demand increases.

- If price is below P_E, there will be excess _____ for a good.

Suppliers begin to offer the good at higher prices and suppliers will produce more as price rises.

Eventually market equilibrium will be restored.

Hence, equilibrium price and quantity are determined **<u>simultaneously</u>**:

$$\mathbf{Q_E = Qd = Qs}$$

The equilibrium price is found when quantity demanded equals the quantity supplied.

$$\mathbf{D(P_E) = S(P_E)}$$

The Difference Between the "Everyday" Meaning of Demand and Supply

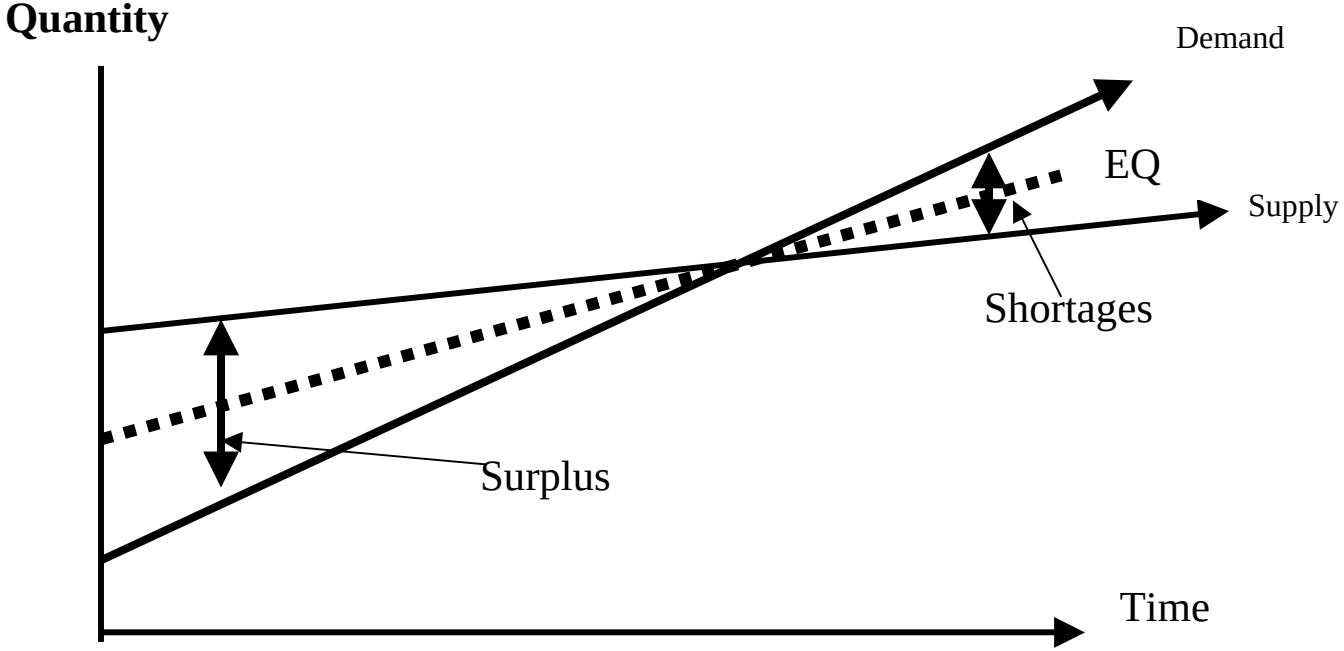
To non-economists, "demand" refers to '***wants***' and "supply" refers to '***productive limitations***.'

With these interpretations, it is inevitable that there will be a shortage or surplus because _____ plays **no** role in the analysis.

Since the general public ignore how _____ acts as a regulator to equate the quantity demanded with the quantity supplied, they may erroneously believe that management of the market equilibrium is a matter of simply controlling consumption of resources or establishing policies that control production or encourage technological growth.

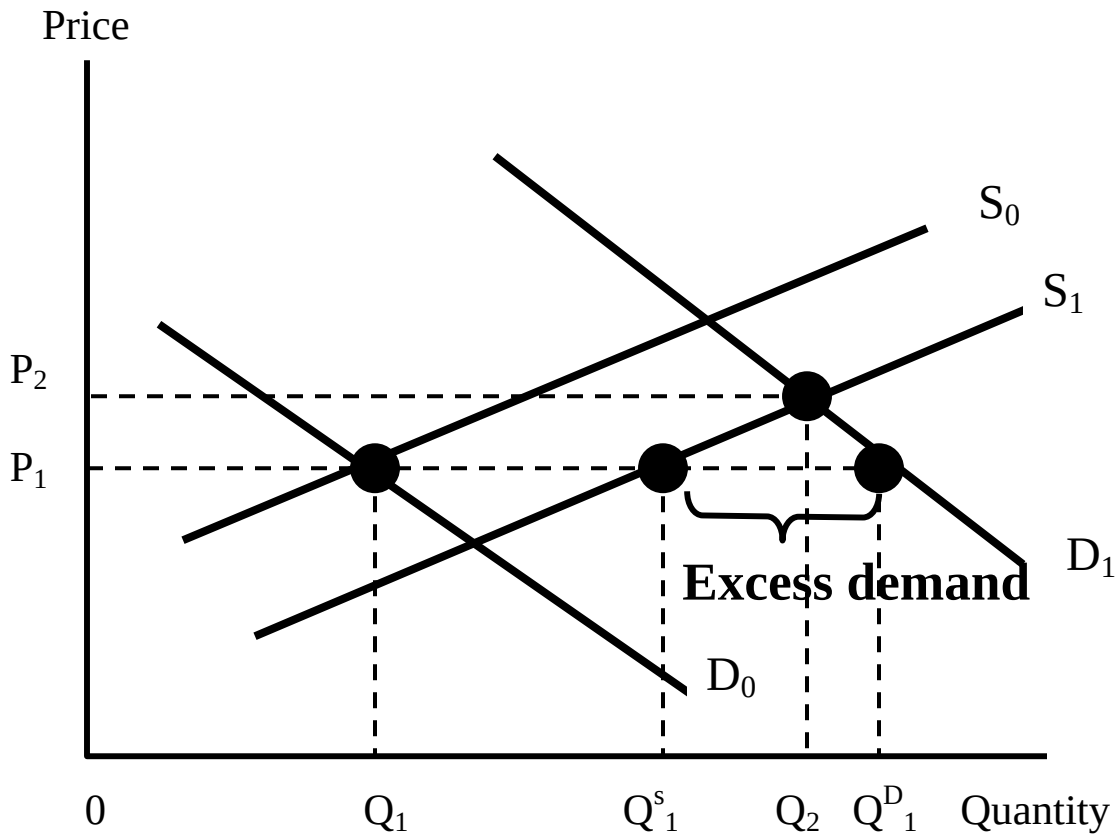
In contrast, economists recognize the importance of **price** in maintaining and re-establishing market equilibrium.

Hence, _____ acts to eliminate surpluses and shortages.



Equilibrium Quantity: Qd=Qs ▪▪▪▪▪

Changes in Equilibrium: Shifts in Demand & Supply



Why do we experience shortages?

Suppose the demand and supply functions _____ to the right.

Equilibrium price increases from P1 to P2 and equilibrium quantity increases from Q1 to Q2.

If _____ does not changes, a shortage will occur as **excess** demand.

If the _____ rises, a potential shortage is eliminated by reducing the quantity demanded and inducing producers to increase supply.

Hence _____ do not occur, even if demand and supply increase/decrease at different rates.

Shortages or surpluses will occur if the price change is restricted by regulations or if prices are “sticky.”

The Price Elasticity of Demand and Supply

Introduction:

- Price Elasticity is a **u_____** measurement of the **sensitivity** of the quantity demanded or supplied to a change in the ____.

- This sensitivity measures how much the firm's total _____ will change in response to a price change.

- Total revenue increases or decreases depending on how large the percentage change in the quantity demanded is relative to the percentage change in the price.

Hence, the price elasticity of demand determines whether revenue will rise or fall.

Price Elasticity of Demand

"The price elasticity of demand measures the percentage change in the quantity demanded relative to the percentage change in price."

If the percentage change in the quantity demanded is _____ than the percentage change in price, total revenue will change in the _____ direction to the price change.

Let R=PQ (Total Revenue)

i.e. P increases $\rightarrow$Q decreases$\rightarrow$If Q is > P$\rightarrow$TR decreases

The change in TR is negative.

Price Elasticity and the Total-Revenue Curve:

Elastic (Ed>1)	Price ↑; TR ↓ Price ↓; TR ↑ [Price and revenue move in opposite directions]	Percentage of quantity demanded is larger than percentage on change of price
Inelastic (Ed<1)	Price ↑; TR ↑ Price ↓; TR ↓ [Price and revenue move in same direction]	Percentage of the average quantity demanded is smaller than percentage of the average price
Unitary (Ed=1)	Price ↑; TR unchanged Price ↓; TR unchanged	Percentage of the average quantity demand = percentage of average price

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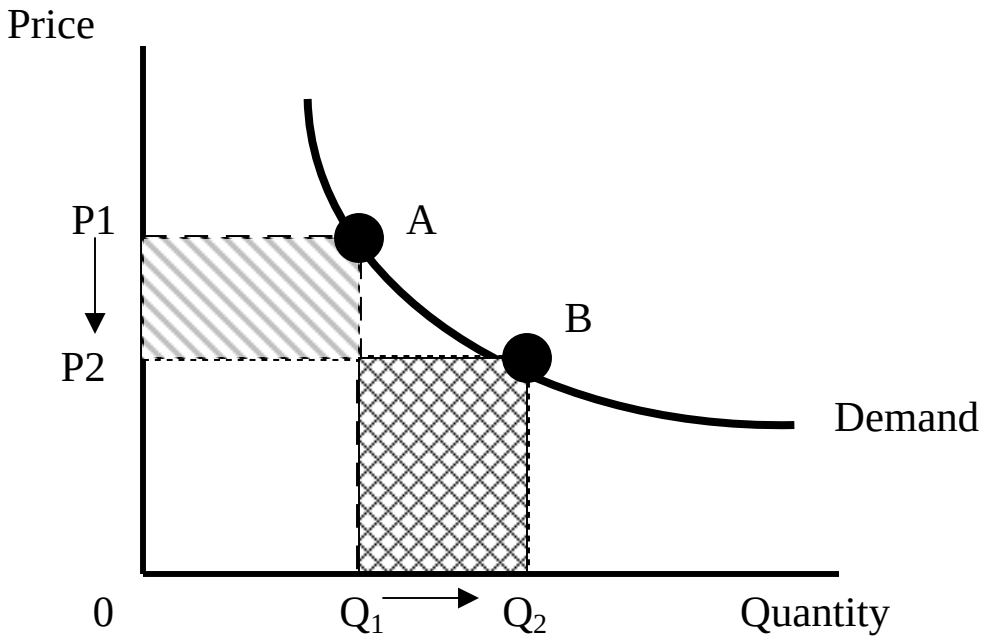


At price P1, the quantity demanded is Q1.

Total revenue= P1*Q1.

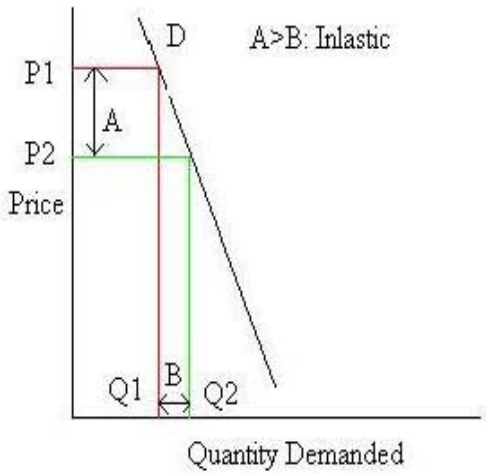
Suppose price falls.

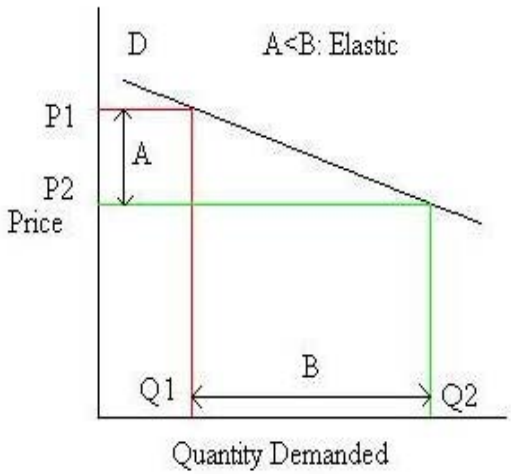
At the new lower price of P2, the quantity demanded is Q2.

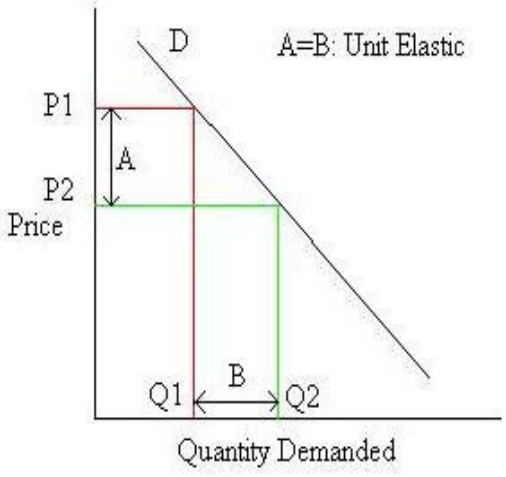
⇨Total revenue is P2*Q2.

At the lower price, the firm can sell **more** units.

In this case, total revenue _____, but this is not always the case. It depends on how **sensitive** a change in quantity demanded is to a change in price.







The response of revenue to a change in price will result in demand being:

(1) **price** _____ if total revenue increases (decreases) when the change in price decreases (increases).

(2) _____**elastic** if total revenue does not change when the price changes.

(3) **price** _____ if the total revenue changes in the same direction that the price changes.

Calculations:

(I) Point Price Elasticity of Demand (small price changes)

The point price elasticity of demand measures the sensitivity of the quantity demanded to a change in price starting at a point on the _____ curve.

The sign of this elasticity is _____. Hence, it is customary to report the absolute value of the elasticity of demand.

If something is price elasticity, $| Ep | >$__.

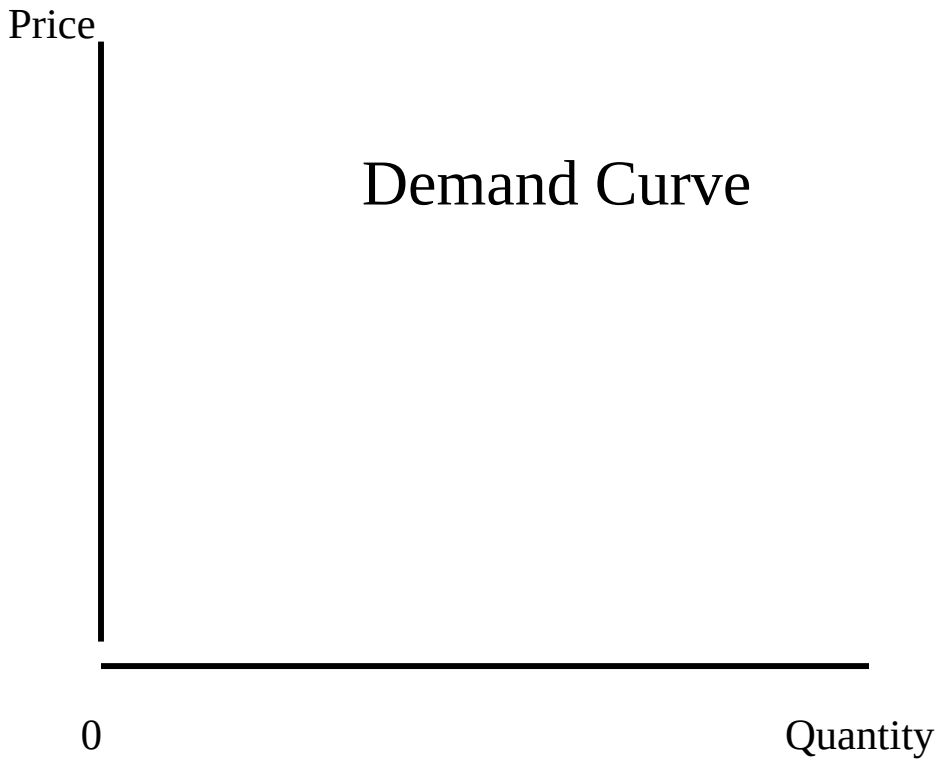
If something is price inelastic, $| Ep | <$__.

$$E_P = \frac{\frac{\Delta Q}{Q}}{\frac{\Delta P}{P}} = \frac{\Delta Q}{\Delta P} \bullet \frac{P}{Q} \quad \Leftarrow \text{ Point Elasticity of Demand}$$

*Note: With straight-line demand functions, the numerical value of the price elasticity is _____ at different points along the demand function because $\Delta Q / \Delta P$ and/or P/Q will change. Only in some 'special' cases this does not hold.

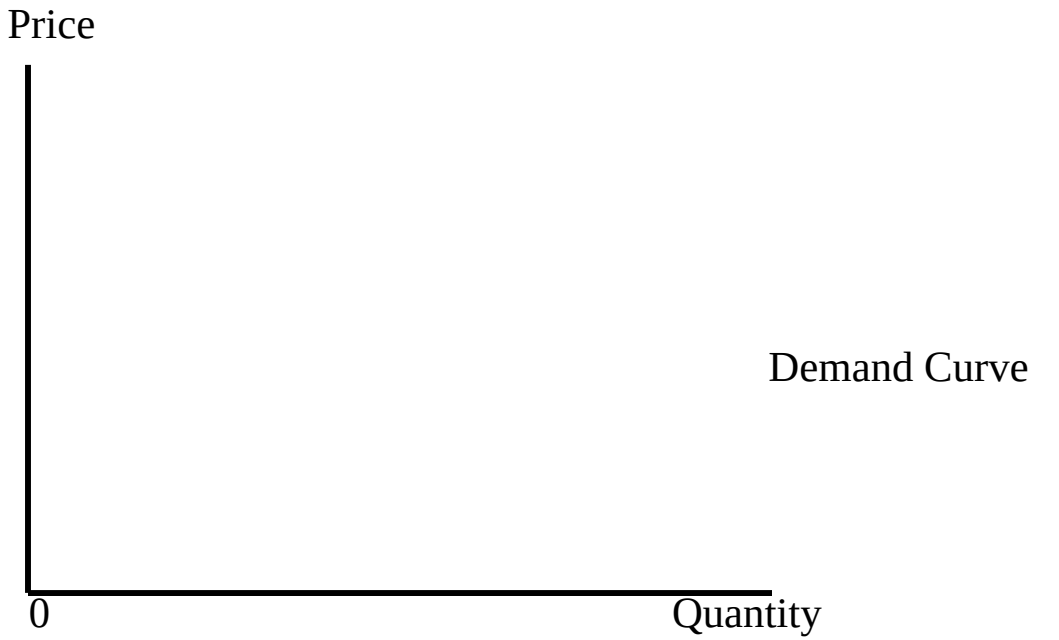
Figure 1:

Demand Curve With Zero Price Elasticity of Demand



Demand curve has a price elasticity of zero: $E_p=0$.
Quantity demanded is unaffected by price.
Example: Insulin

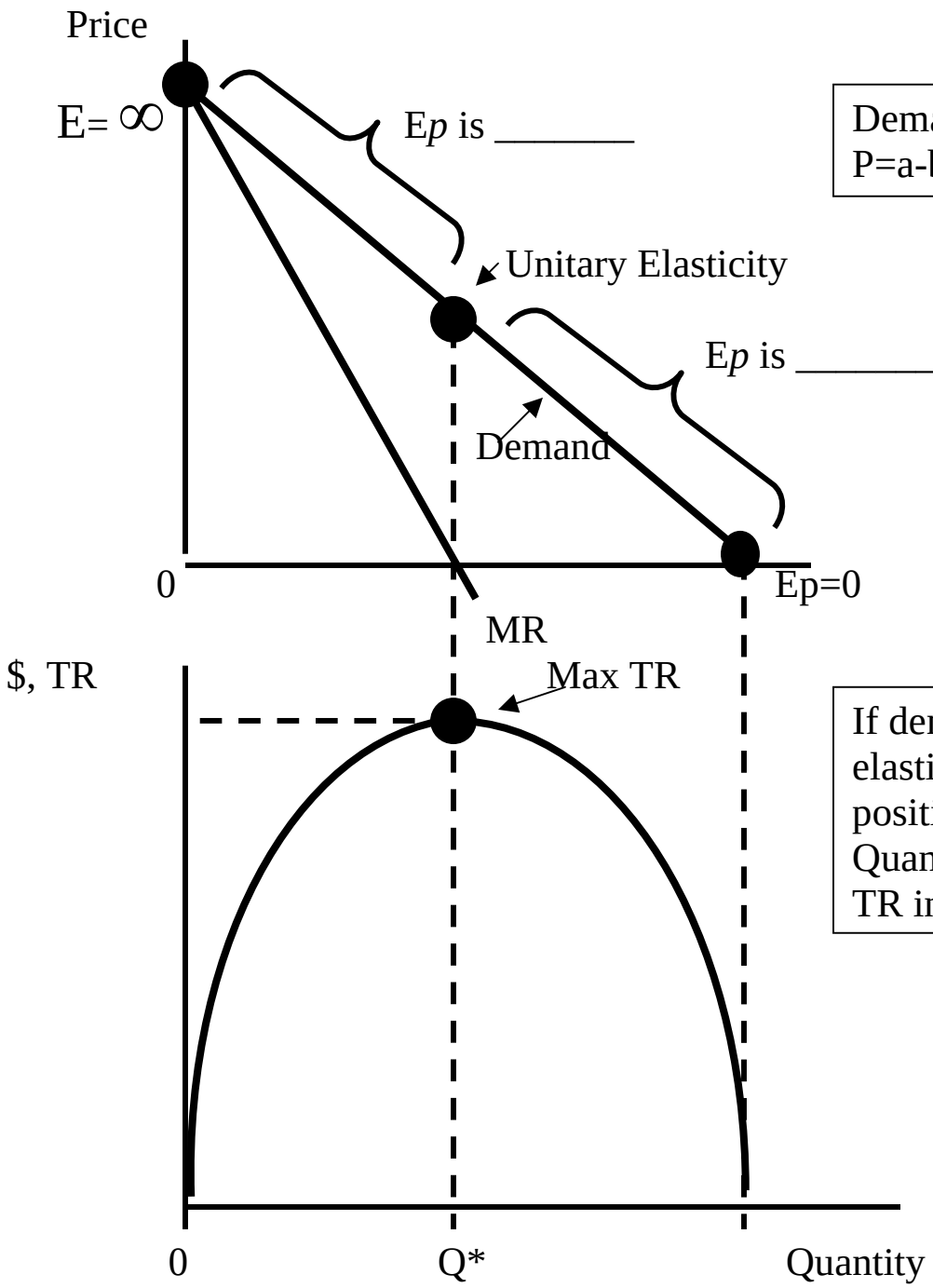
Figure 2:
Demand Curve with Infinite Price Elasticity of Demand



Demand curve price elasticity equals _____: $E_p = \infty$.
Unlimited amount can be sold at a particular price.
Nothing can be sold if the price if the price is increased slightly.

Example: interest rates on GICs.

Figure 3: Values of the Price Elasticities Of Demand Along a Linear Demand Curve



Demand curve: P=a-bQ

If demand is price elastic, MR is positive and as Quantity increases, TR increases

(II) Arc Price Elasticity of Demand (large price changes)

Also measures the percentage change in quantity relative to the percentage change in price.

Arc Price Elasticity: equals the change in quantity relative to the average quantity demanded divided by the change in price relative to the average price.

$$E_p = \frac{\dfrac{\Delta Q}{(Q_1 + Q_2)/2}}{\dfrac{\Delta P}{(P_1 + P_2)/2}} = \frac{\Delta Q}{\Delta P} \bullet \frac{P_1 + P_2}{Q_1 + Q_2}$$

Things to Note: The arc elasticity is:

(i) always _____ because $\Delta Q/\Delta P$ is negative. I.e. the price and quantity demanded will change in the opposite direction.

(ii) not equal to the _____ of the demand function.

The value of the arc price elasticity dictates whether revenue increases, decreases or remains the same when price changes.

Just like the point elasticity of demand, the arc elasticity of demand has **three** possible outcomes:

(1) If arc price elasticity is less than -1, demand is considered price **e_____**.

- Total revenue will change in the _____ direction to the price change.

⇨An increase in price leads to a decrease in total revenue.

(2) If arc price elasticity is equal to -1, demand has **unitary** elasticity.

⇨A change in price does not change total revenue.

(3) If arc price elasticity is between -1 and 0, demand is price-**inelastic**.

◆Total revenue will change in the _____direction as the price change.

⇨An increase in price leads to an increase in revenue.

Factors That Determine the Size of Price Elasticity of Demand

1. **The higher the percentage of a consumer's total _____spent on a good, the more price-elastic is the demand for that good**.

Expensive items are very _____ sensitive. Small changes in price, may lead to large changes in quantity demanded.

The Mercedes-Benz S-Class is a luxury sedan

18 or more karat gold jewelry is an example of a luxury good.

2. The more _____ products, the more demand will be price-elastic.

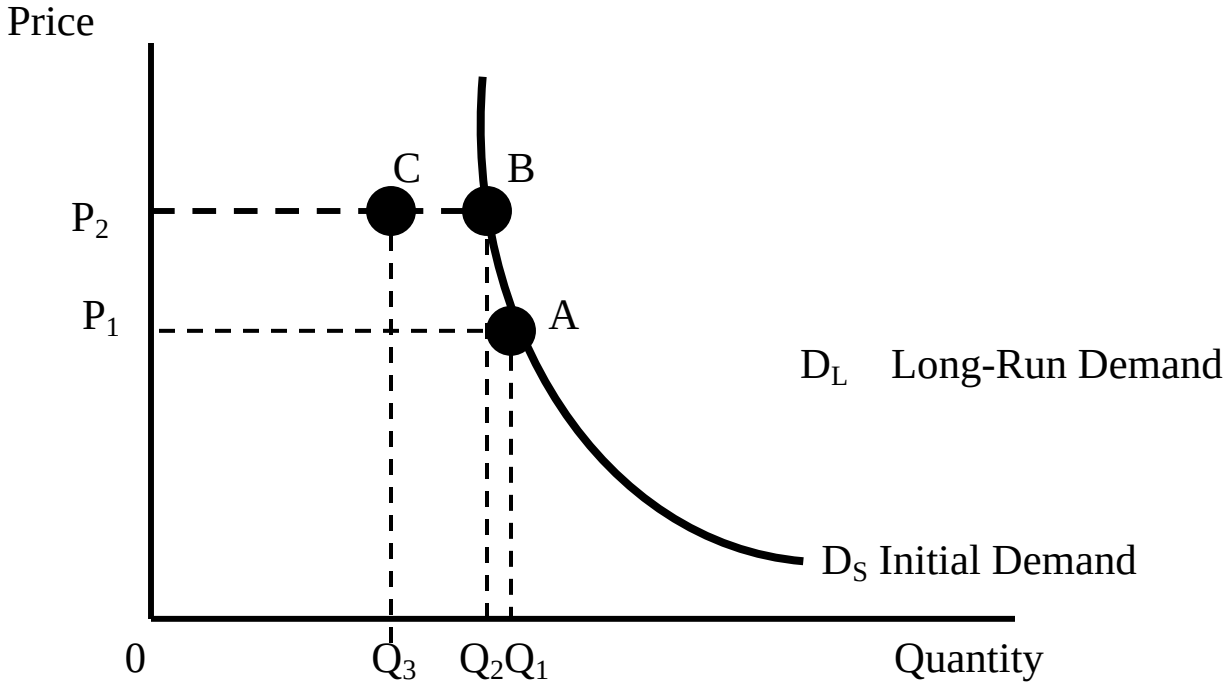
If the price of one type of pencil increases by a small amount, the demand for than pencil may dramatically drop. This is because there are many substitute pencils that offer the same quality of writing ability.

Other Examples: cel-phones, airlines, fast-food, etc.

3. As income rises and consumers continue to spend an increasing _____ of their increasing income on a good, these goods also have more elastic demand functions, other things remaining the same.

Examples: Houses, cars, vacations, etc..

4. **Time**: the more ____ for consumers to gather information about substitute products, the more price _____ is the demand for the good. In the short-run, a price change may have very little affect on the quantity of the good demanded. But, in the long-run, as consumers become more informed about substitute products, this price change may have a more dramatic affect on the quantity demanded. Hence, price increases may be a big mistake in the long-run.



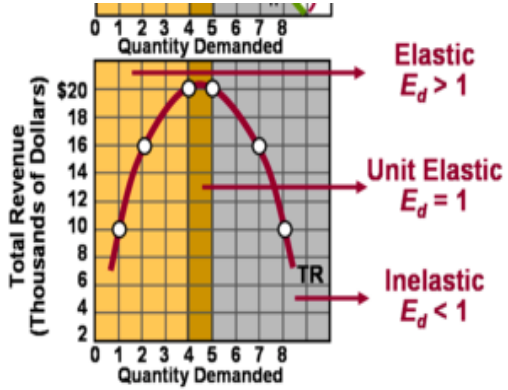
As time goes by, consumers become more aware of alternative products.

The demand function becomes more _____ in the long-run.
Suppose the initial demand function for a good is D_S.
I.e. Honda Accord.

At P_1 ($45,000) demand is Q_1.
The price of the Honda increases to P_2 ($49,000). The quantity demanded is now Q_2.

But after some investigation, into substitute vehicles, (Nissan, Mazda 626, Toyota, Lexus, etc., the quantity demanded at price P_2 is Q_3. The long run demand curve is flatter and more price sensitive.

Determinants of Price Elasticity of Demand:
(remember **SPLAT!**)



1. ***Substitutability***: Direct relationship between the number of substitute goods of a product and the elasticity of the product

# of substitutes up = elasticity up
# of substitutes down= elasticity down

> ***(ex):*** *If Reebok running shoes are the only choice of running shoes available, its number of substitutes is low and people would not be very sensitive towards its price changes because they need running shoes anyway. Hence, elasticity goes down.*
> *If other companies such as Nike and Adidas start to manufacture running shoes as well, the number of substitutes would go up and if Reebok still increases its prices, people would buy the substitutes instead. Hence, elasticity goes up.*

2. ***Proportion of Income***: If other things are equal, there's a direct relationship between the price of good relative to income and the elasticity of demand of the good.
The higher the price of a good relative to consumer's incomes, the greater the price elasticity of demand.

> **(ex)** Price of toothpaste up by 10% = few dollars extra. Consumers will still buy the toothpaste since its still relatively cheap.
> Price of sports car up by 10% = few thousand dollars extra. Consumers will react sharply to the price increase because the original price of the good is already so high.

3. ***Luxuries vs. Necessities:***
Necessities = inelastic, we NEED it no matter what price; ex: food
Luxuries = elastic, we can do without it; ex: Designer handbag

4. ***Addictiveness***: If the product is very addictive (i.e. cigarettes) people will continue to buy the product regardless of price

5. ***Time***: Basically,
Short time (Less durable) to consider whether to buy a product = inelastic. No time to adjust to price change
Long time (durable) to consider whether to buy a product = elastic. Plenty of time creates consumer sensitivity (The longer the time the more elastic the good becomes.)

Price Elasticity of Supply

The **price elasticity of supply** measures the percentage change in the _____ supplied relative to the percentage change in _____.

The price elasticity of supply is an indicator of how sensitive quantity supplied is to a change in price.

The price elasticity of supply is usually positive because, as the price of a good _____, the quantity supplied will increase.

There are two measures for the price elasticity of supply:

(I) The Point Price Elasticity of Supply

-Measures the sensitivity of the quantity supplied to a price change at a point on the supply function:

$$N_p = \frac{\frac{\Delta Q}{Q}}{\frac{\Delta P}{P}} = \frac{\Delta Q}{\Delta P} \bullet \frac{P}{Q} \quad \Leftarrow \text{ Point Price Elasticity of Supply}$$

(II) The Arc Price Elasticity of Supply

-Measures the relative responsiveness of the quantity supplied to a price change between two points on the supply function.

$$N_p = \frac{\frac{\Delta Q}{(Q_1 + Q_2)/2}}{\frac{\Delta P}{(P_1 + P_2)/2}} = \frac{\Delta Q}{\Delta P} \bullet \frac{P_1 + P_2}{Q_1 + Q_2} \Leftarrow \text{Arc Price Elasticity of Supply}$$

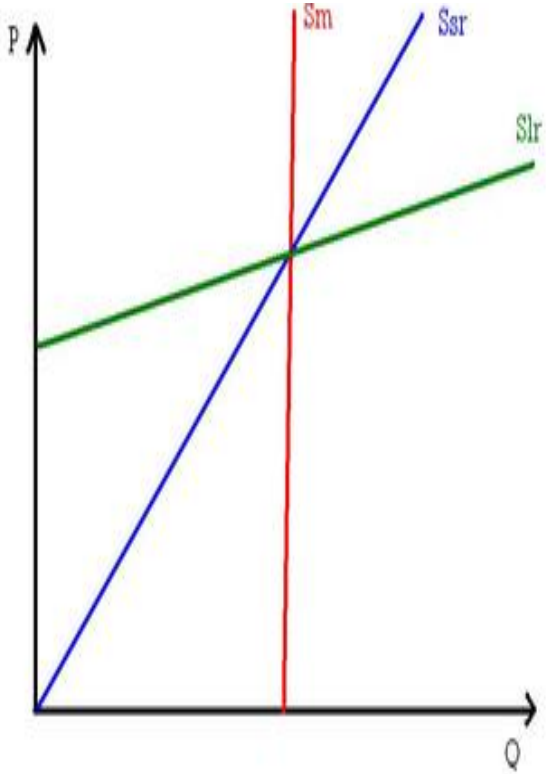
Note: Although the formulas for the arc price elasticities are identical, the two points are on the _____ function, not the demand function.

- When a price change has almost no affect on the quantity supplied, the price elasticity of supply will be very close to zero.
  - ⇨ The supply function will be very _____.

- When a price change results in a large change in the quantity supplied, the price elasticity of supply will be a larger positive number.
  - ⇨ The supply function will be more ____ (elastic) and sensitive to changes in price.

Price Elasticity of Supply

- **Price Elasticity of Supply:**
- The degree of price elasticity of supply depends on how easily - and therefore quickly - producers can shift resources between alternative uses. Unlike PED, there is no Total Revenue Test for Price Elasticity of Supply.
    - Because there is a direct relationship between Price & Total revenue, they always move together.



<--Graph: as the time increases, supply becomes more elastic; the slope decreases (becomes less slanted), thus a small change in price yields a huge change in quantity supplied

DETERMINANT OF PRICE ELASTICITY OF SUPPLY: TIME!

THREE PERIODS: Market period--> short run --> long run

- **Price Elasticity of Supply: the Market Period:** The period that occurs when the time immediately after a change in market price is too short for producers to respond with a change in quantity supplied.
  - Suppliers cannot be picky with the price they sell their goods for
  - Some goods do not even have a market period (time is too short for any response)
  - It has a Vertical Supply Curve (meaning it is inelastic)

- **Price Elasticity of Supply: the Short Run (fixed-plant period):** supply is more elastic, but not terribly so, as the time period is short
  - The period of time is not enough to change the output significantly; producers have less time to react to the change
  - ex. if gasoline prices rise, in the short run, producers are stuck with their current less fuel efficient machines and still need to produce the same output. When given time to adjust, producers can introduce fuel efficient machines, and production cost will drop and yield more quantity supplied. Thus PES becomes more elastic
  - plants *intensify* production and output by working longer hours, having workers work overtime, and using all available resources to the max
  - It has a steeper slope than that of the supply curve in the long run

- **Price Elasticity of Supply: the Long Run (variable-plant period):** supply becomes more elastic over a longer period of time.
  - Why? because over time, new technology will adapt to the change in price to create more efficiency, and more time is allowed to allocate resources to a different field or allocate more resources to the same field
  - **TIME** is the major determinant of the price elasticity of supply!!! Noticeably More Horizontal Slope
  - ex. in the long-run, firms have time to change their size and adjust their production plants to suit whatever new product they want to produce.