Supply & Demand

Demand

Demand

- Buyers establish how much they will buy at each price point based on benefit vs. cost.
- A buyers benefit is simply the utility or satisfaction they derive from consuming that product.
- The buyer's cost is the price they pay the seller.

Demand

- Benefits ≥ Cost, otherwise they will not buy the product.
- Buyers seek to maximize satisfaction.

Demand

Demand is a function of

- Price
- Income
- Prices of related Goods
- Tastes and Preferences
- Number of customers

Demand

Price

- In a market, price is the focal point in each transaction.
- Price is the only common variable between the buyer and seller in determining sales.
- Consequently, in examining buyer behavior in the market we graph the quantity demanded as a function of price.

Demand

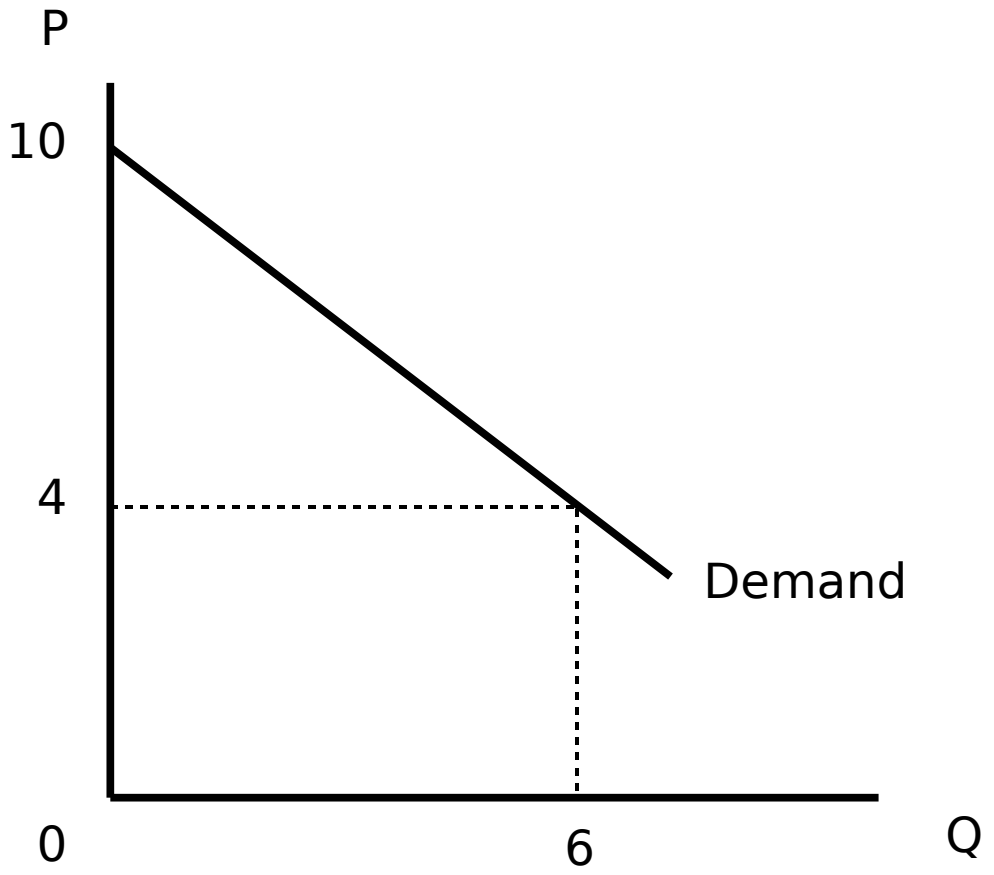
Quantity demanded

- The amount a customer is willing and able to buy at each price point.
- When demand is graphed as a function of price, all other variables are held constant.

Demand Line

Soda Demand

P	Q
10	0
8	2
6	4
4	6
2	8



Demand

Law of Demand

- As price increases, the quantity demanded decreases.
- As price decreases, the quantity demanded increases.

Demand

Measuring Change in Quantity Demanded: Slope

- Slope = rise/run = chg P / chg Q
- (10-4)/(0-6) = 6/-6 = -1
- Th slope represents the price change necessary to increase quantity demanded by one unit which in case is a $1 decrease.

Demand

Measuring Change in Demand: Intercept

- The vertical intercept is the point where the line crosses the vertical axis.
- From the graph, 10.
- From the demand point of view, it is the limit of prices that buyers will tolerate. At that price they will not buy one unit.

Demand

Constructing the Demand Line

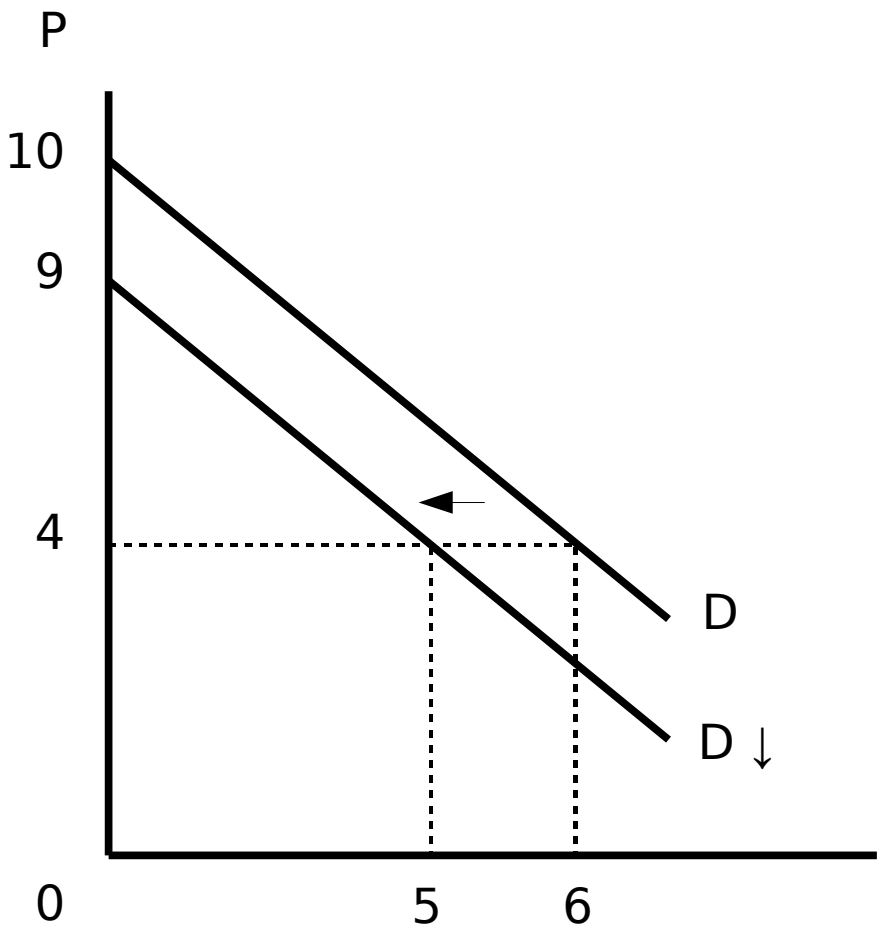
- Price = Intercept + Slope * Quantity.
- P = 10 – 1Q

Demand

Notes on the Equation for a line

- The slope and vertical intercept are used to construct the demand equation.
- An equation that describes a line needs two elements: the vertical intercept and the slope. $Y = b + mX$
- Where Y is the variable on the vertical axis, X is the variable on the horizontal axis, b is the vertical intercept and m is the slope.

Changes in Demand



- Suppose demand decreases one unit at each price point.
- The new intercept would be 9.
- Demand shifts left for a decrease.

Determinants of Demand

- When at each price point, the quantity demanded increases, we say that the demand curve has shifted.
- The shifts are due to anything except a change in price.

Determinants of Demand

Also known as “Demand Shifting Factors”

- Income
- Number of Buyers
- Prices of Other Goods
- Tastes and Preferences

Determinants of Demand

Tastes and Preferences

- Improvements (deterioration) in tastes lead to increased (decreased) demand.
- Tastes and preferences are influenced by advertising.

Determinants of Demand

Number of Buyers

- Basically the number of buyers is the population available to buy your product.
- Increases (decreases) in the number of buyers increases (decreases) demand.

Determinants of Demand

Income

- Normal Effect: Increases (decreases) in income increase (decrease) demand.
- Inferior Effect: Increases (decreases) in income decrease (increase) demand.
- Most products are normal goods.

Determinants of Demand

Prices of Other Goods

- Substitute Goods: Increases (decreases) in the price of substitute goods increase (decrease) demand.
- Complementary Goods: Increases (decreases) in the price of complementary goods decrease (increase) demand.

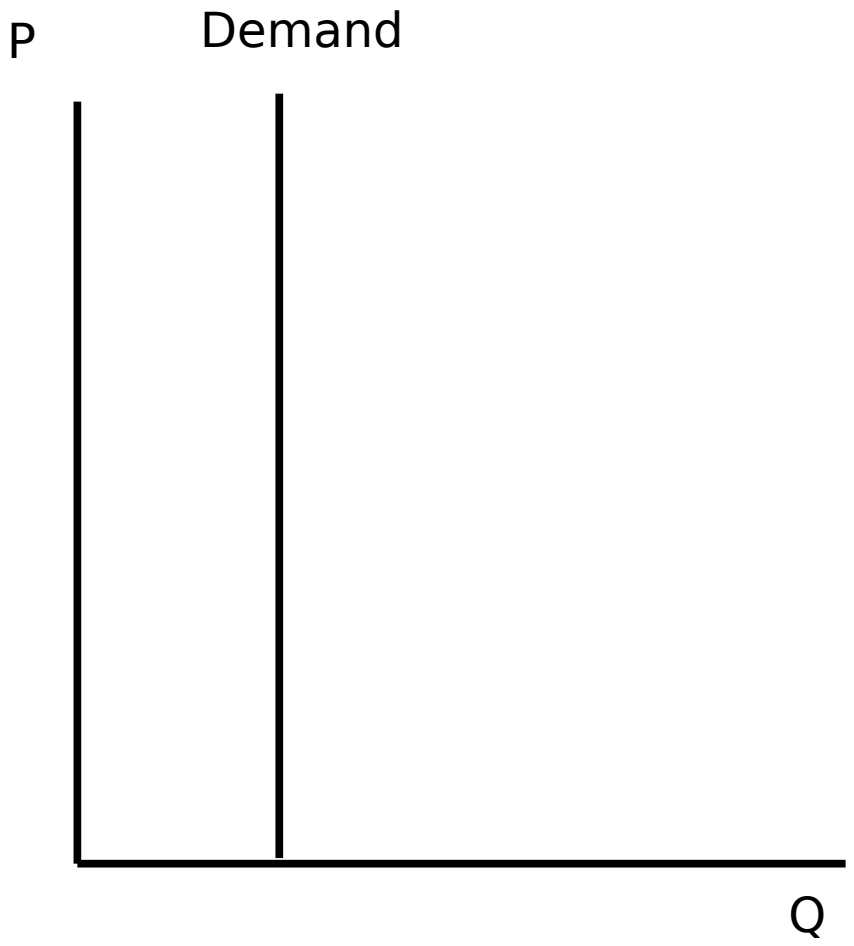
Determinants of Demand

Prices of Other Goods

- Some goods may have more than one substitute or complement.
- Complementary goods are consumed with the original good.

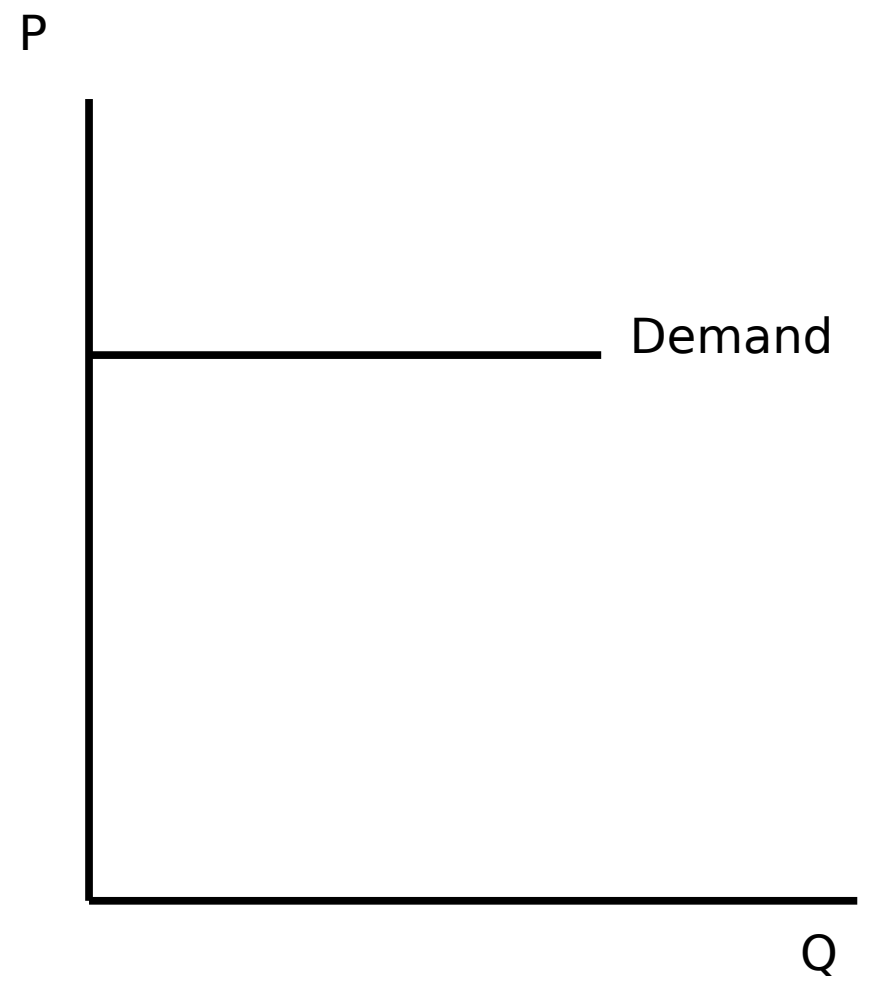
Demand Price Sensitivity

- When demand is price insensitive, we say demand is inelastic.
- Consumers will pay any price to obtain this good.
- Example: drugs



Demand Price Sensitivity

- When demand is price sensitive, we say demand is elastic.
- Consumers will not pay more this good.
- Example: water



Sample Demand Problem

- Suppose price increases by $6, how much will be the change in quantity demanded given a slope of -3?

Sample Demand Problem

- Suppose price increases by $6, how much will be the change in quantity demanded given a slope of -3?
- Answer: -3 = $6/Q, Q = -2

Sample Demand Problem

- What price change is needed to increase quantity demanded 100 when slope equals -4?

Sample Demand Problem

- What price change is needed to increase quantity demanded 100 when slope equals -4?
- Answer: -4 = P / 100; P = -400

Sample Demand Problem

- What is the slope of demand when quantity demanded increases 50 for $10 price decrease?

Sample Demand Problem

- What is the slope of demand when quantity demanded increases 50 for $10 price decrease?
- Answer: Slope = -10 / 50 = -.2

Sample Demand Problem

- Given the equation of a line:

$$P = 100 - .02Q$$

1) What is the slope?
2) What is the vertical intercept?

Sample Demand Problem

Given the equation of a line:

$$P = 100 - .02Q$$

1) What is the slope?

   slope = -.02

2) What is the vertical intercept?

   intercept = 100

Sample Demand Problem

Given the equation of a line:

$$P = 100 - .02Q$$

1) If Q = 100, then P = ?

2) If P = 80, the Q = ?

Sample Demand Problem

Given the equation of a line:

$$P = 100 - .02Q$$

1) If Q = 100, then P = ?

$$P = 100 - .02(100) = 98$$

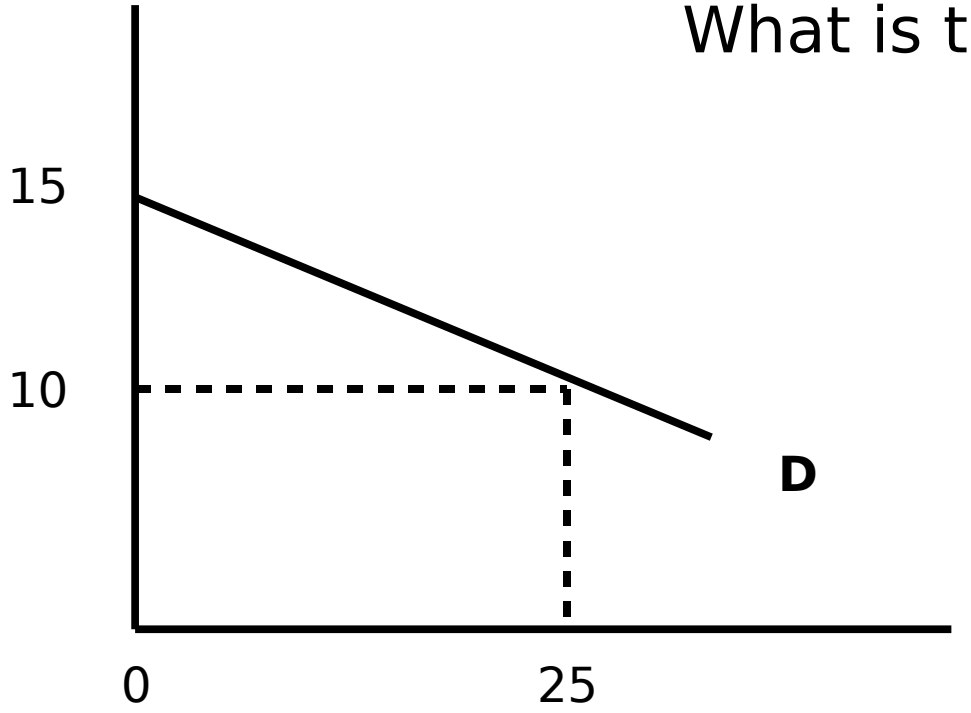
2) If P = 80, the Q = ?

$$80 = 100 - .02Q$$

$$Q = 1{,}000$$

Sample Demand Problem

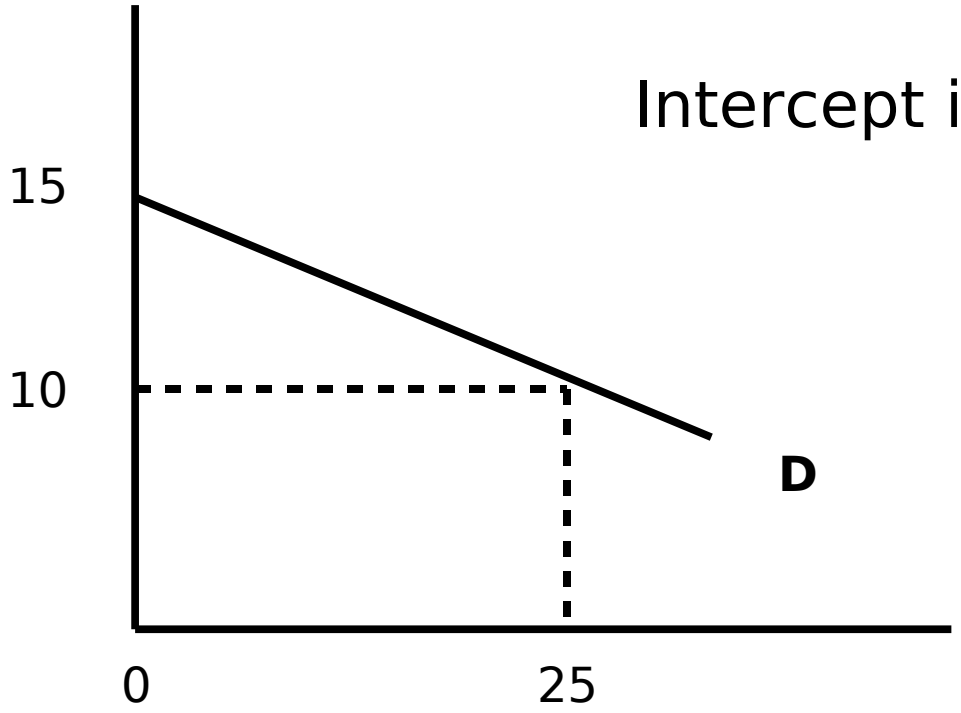
What is the slope of this line?
What is the vertical intercept?



Sample Demand Problem

Slope = (15-10)/(0-25) = -.20

Intercept is 15



Supply

Supply

- Sellers establish how much they will sell at each price point based on benefit vs. cost.
- A seller's benefit is the revenue they earn from selling the product at the market price.
- Sellers seek to maximize profit.
- A seller's cost is the sum of all operational (production), marketing, and financial costs incurred.

Supply

- Supply is a function of:
  - Price (P)
  - Input Costs (C)
  - Prices of goods related in production (Pp)
  - Production Technology (Te)
  - Number of suppliers (Ne)
  - Taxes & Subsidies (TS)

Supply

Price

- In a market, price is the focal point in each transaction.
- Price is the only common variable between the buyer and seller in determining sales.
- Consequently, in examining buyer behavior in the market we graph the quantity supplied as a function of price.

Supply

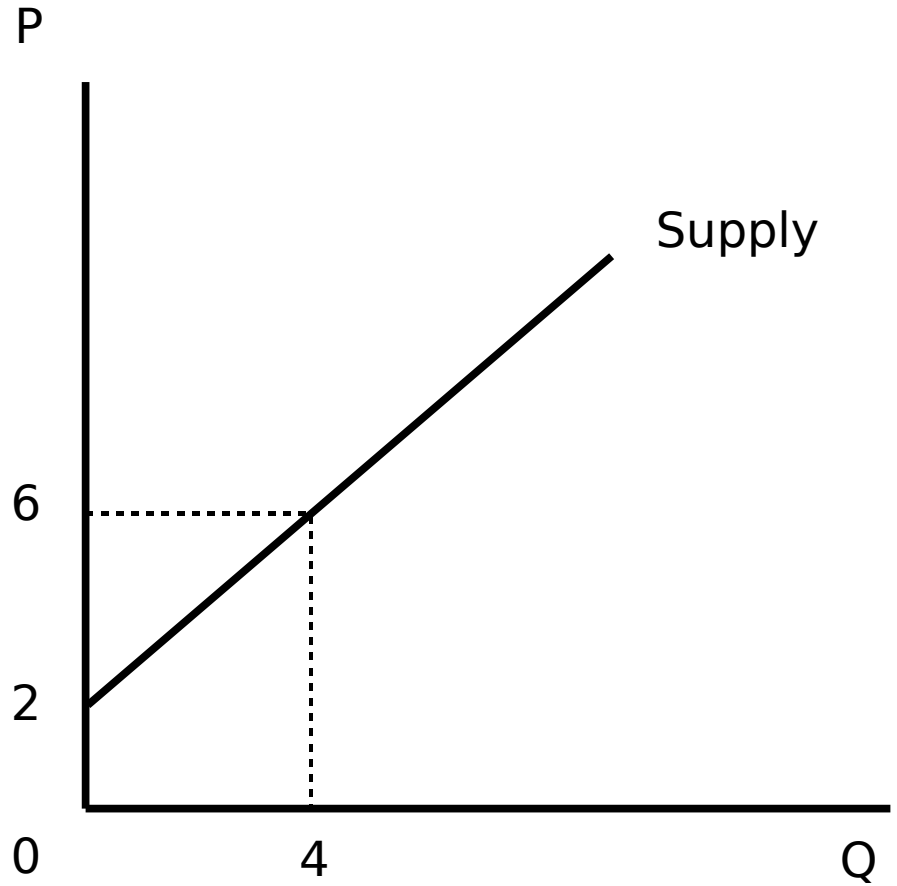
Quantity Supplied

- amount supplier is willing and able to sell at the given price.
- When supply is graphed as a function of price, all other variables are held constant.

Supply Line

Soda Supply

P	Q
2	0
4	2
6	4
8	6
10	8



Supply

Law of Supply

- As price increases, the quantity supplied increases.
- As price decreases, the quantity supplied decreases.

Supply

Measuring Change in Quantity Supplied: Slope

- Slope = rise/run = chg P / chg Q.
- (2-6)/(0-4) = -4/-4 = 1
- Slope represents the price change necessary to increase quantity supplied by one unit which in this case is $1.

Supply

Measuring Change in Supply: Intercept

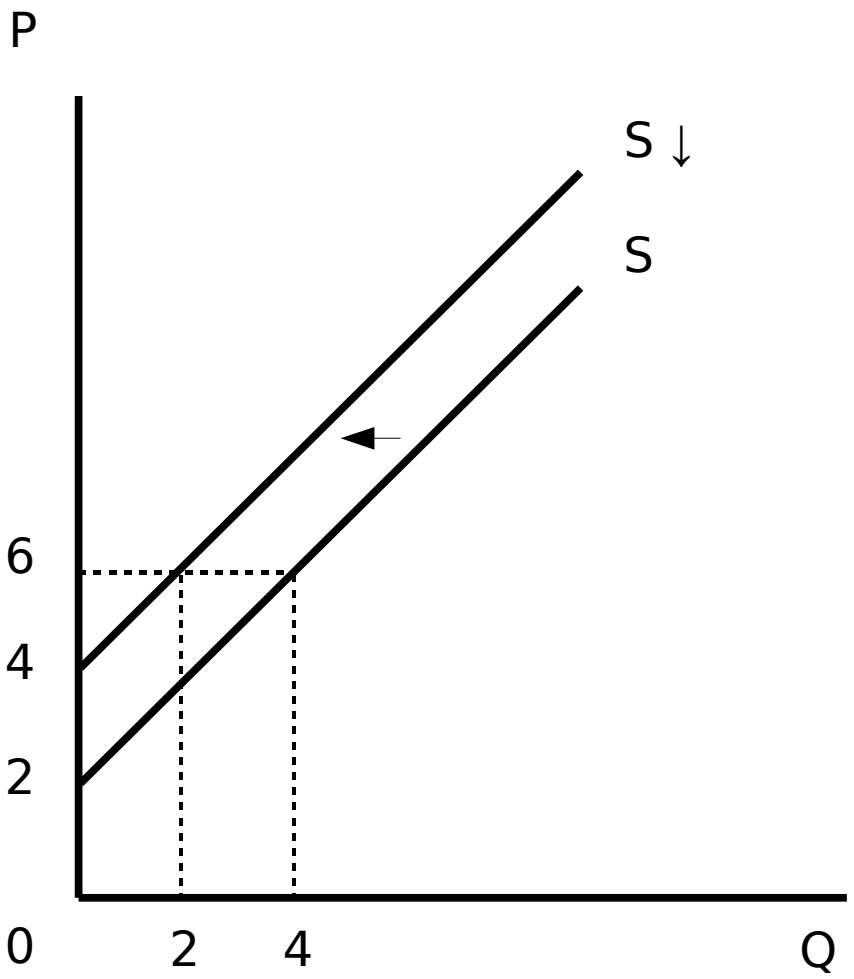
- The vertical intercept is where the supply is zero.
- From the graph, 2
- The intercept represents the price at which costs exceed benefits, where profitability is insufficient to justify supply.

Supply

Constructing the Supply Line

- Price = Intercept + Slope * Quantity
- P = 2 + 1.0Q

Changes in Supply



- Suppose supply decreases two units at each price point.
- The new intercept would be 4.
- Supply shifts left for a decrease.

Determinants of Supply

- When at each price point, the quantity supplied increases, we say that the supply curve has shifted.
- The shifts are due to anything except a change in price.

Determinants of Supply

- Also known as “Supply Shifting Factors”
  - Technology
  - Number of Suppliers
  - Input Costs
  - Prices of Other Goods Related by Production
  - Taxes & Subsidies

Determinants of Supply

Technology (productivity)

- Improvements (deterioration) in technology, increase (decrease) supply.
- Technology from a production viewpoint, is an improvement in productivity.

Determinants of Supply

Number of Suppliers

- Increases (decreases) in the number of suppliers increases (decreases) supply.
- The restaurants is a good example where the number of suppliers is constantly changing.

Determinants of Supply

Input Costs

- Increasing (decreasing) input costs decreases (increases) supply.
- Major inputs are labor, materials, and capital.
- Costs are THE major factor used by businesses in determining price.

Determinants of Supply

Prices of Other Goods Related by Production

- Increases (decreases) in the prices of goods related by production decrease (increase) supply.
- This is related to the concept of opportunity cost, profits lost when not producing something else.

Determinants of Supply

Prices of Other Goods Related by Production

- Example: making pizza rather than pasta as profits are higher in pizza.

Determinants of Supply

Taxes & Subsidies

- Increases (decreases) in taxes, decreases (increases) supply.
- Increases (decreases) in subsidies, increases (decreases) supply.
- Subsidies are payments from gov't to firms.

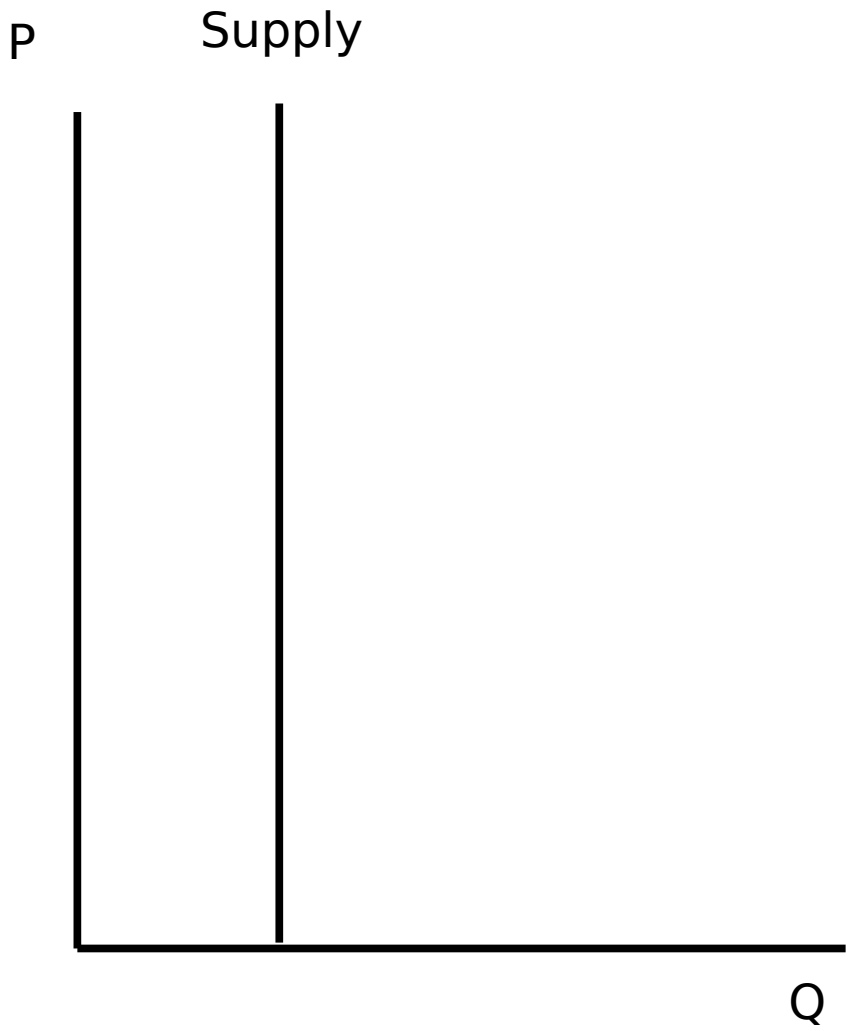
Determinants of Supply

Taxes & Subsidies

- Although not covered here, how taxes are assessed is nearly as important as the amount assessed.

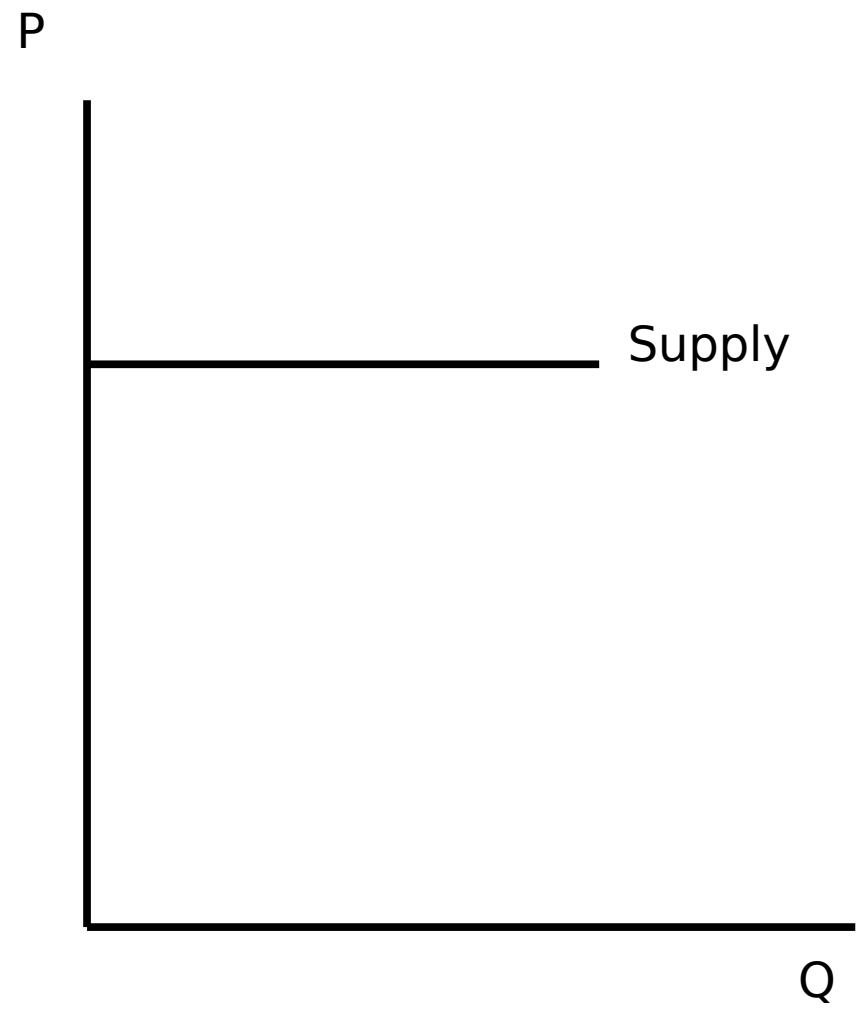
Supply Price Sensitivity

- When supply is price insensitive, we say supply is inelastic.
- Resource is supplied regardless of price.
- Example: land.



Supply Price Sensitivity

- When supply is price sensitive, we say supply is elastic.
- Typically, this implies the per unit cost of production is constant.



Sample Supply Problem

- Suppose price increases by $6, how much will be the change in quantity supplied, given a slope of 2?

Sample Supply Problem

- Suppose price increases by $6, how much will be the change in quantity supplied, given a slope of 2?

Solution

- 2 = 6 / Q
- Q = 3

Sample Supply Problem

- What price change is needed to increase quantity supplied 100 when slope equals 3?

Sample Supply Problem

- What price change is needed to increase quantity supplied 100 when slope equals 3?
- Answer: $3 = P / 100$; $P = 300$

Sample Supply Problem

- What is the slope of supply when quantity supplied increases 50 for 5 price increase?

Sample Supply Problem

- What is the slope of supply when quantity supplied increases 50 for 5 price increase?
- Answer: slope = 5 / 50 = .10

Sample Supply Problem

Given the equation of a line:

$$P = 10 + 1{,}000Q$$

1) What is the slope?

2) What is the vertical intercept?

Sample Supply Problem

Given the equation of a line:

$$P = 10 + 1{,}000Q$$

1) What is the slope?

slope = 1,000

2) What is the vertical intercept?

intercept = 10

Sample Supply Problem

Given the equation of a line:

$$P = 10 + 1{,}000Q$$

1) What is the price when Q = 100?

2) If the price is $3,010, what is the quantity?

Sample Supply Problem

Given the equation of a line:

$$P = 10 + 1{,}000Q$$

1) What is the price when Q = 100?

$$P = 10 + 1{,}000(100) = 100{,}010$$

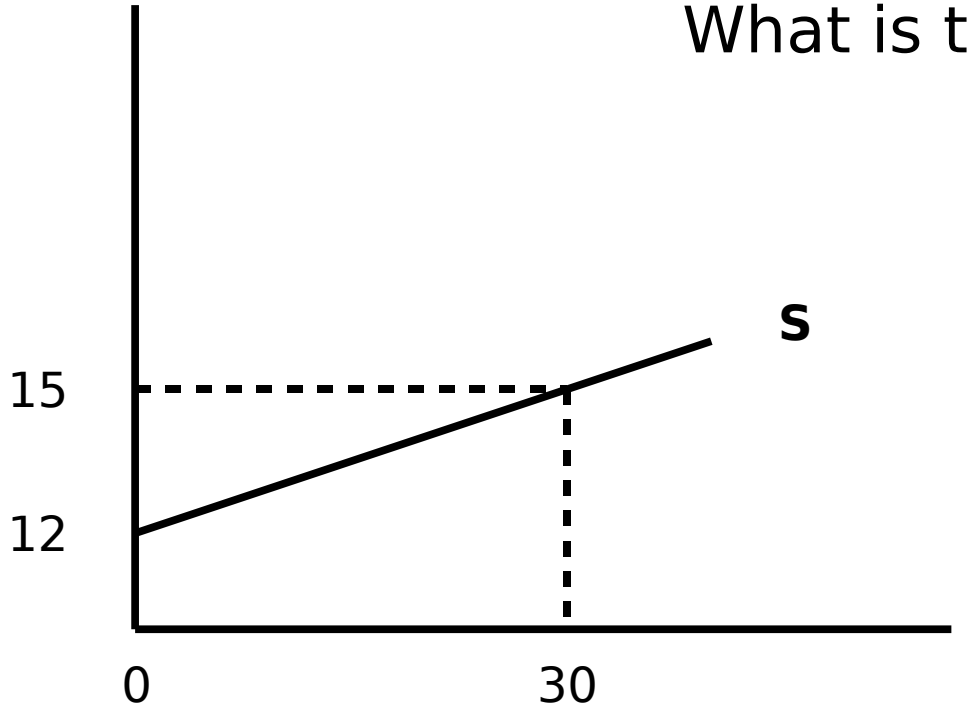
2) If the price is $3,010, what is the quantity?

$$\$3{,}010 = 10 + 1{,}000Q$$

$$Q = 3$$

Sample Supply Problem

What is the slope of this line?
What is the vertical intercept?

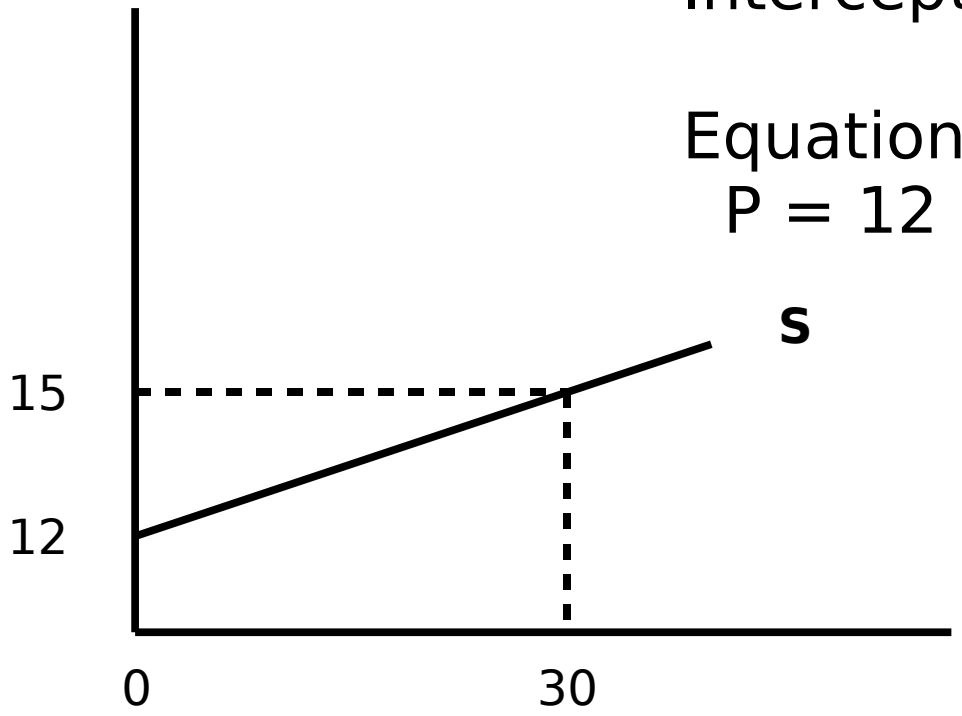


Sample Supply Problem

Slope = (15-12)/(30-0) = .10

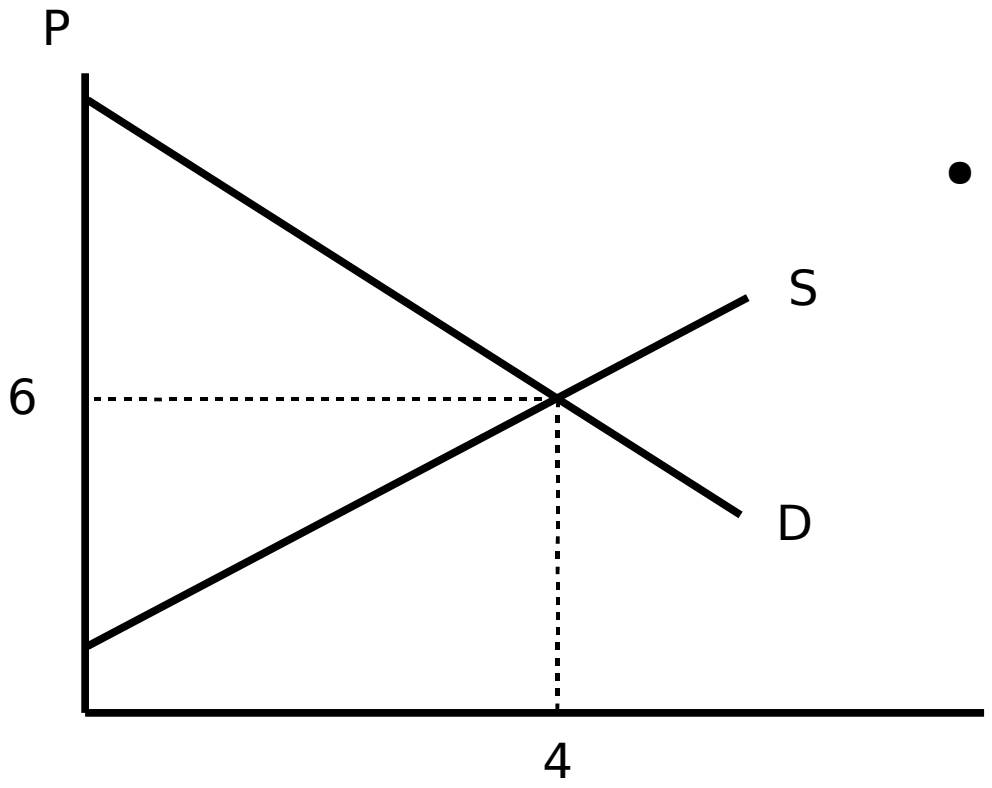
Intercept is 12.

Equation of line is
P = 12 + .1Q



Market Equilibrium

Market Equilibrium



- Equilibrium occurs where Supply = Demand.
- Where the lines intersect.

Market Equilibrium

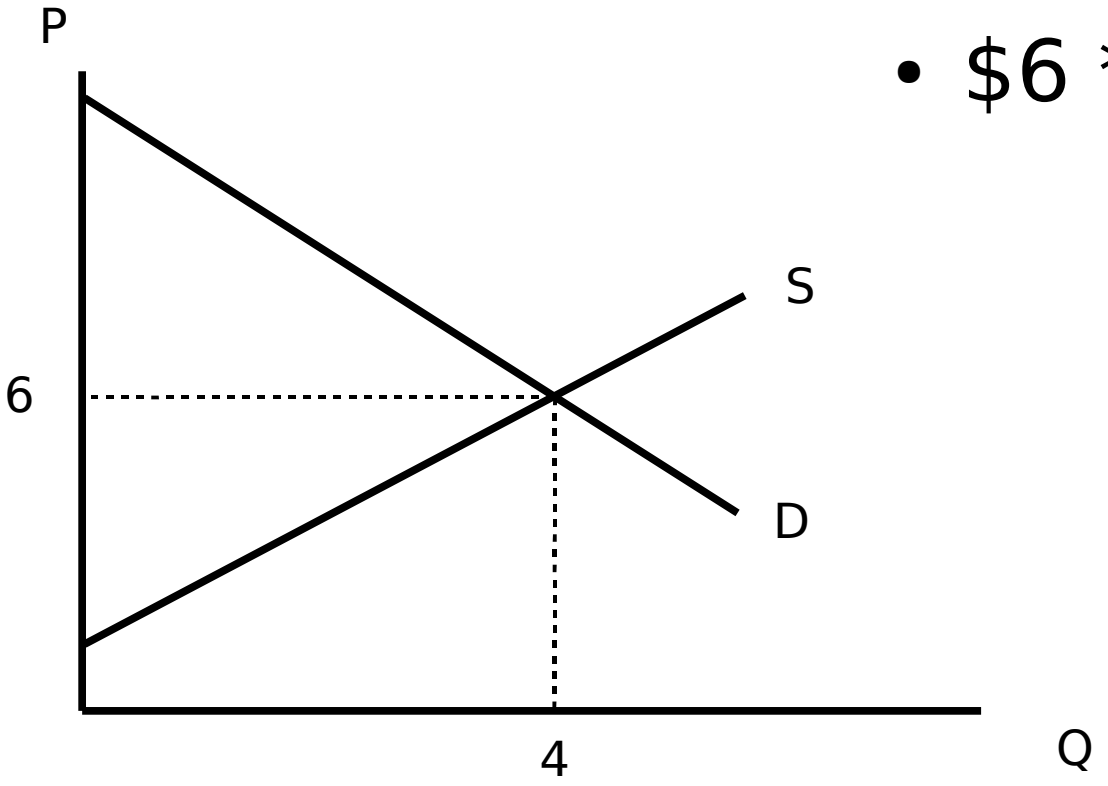
- Definition: at the prevailing price all buyers can buy what they want and sellers sell what they want. Quantity demanded = Quantity supplied
- Excess supply is eliminated.
- Excess demand is eliminated.
- On a graph, it is the point where Demand intersects Supply.

Market Equilibrium: Calculation

Sample Calculation Procedure

- Set equations equal to one another since they both equal P
    - 10 - Q = 2 +Q
- Combine like variables
    - 2Q = 8: Q = 4
- Substitute for Q in either equation for P.
    - 2 + (4) = 6
    - 10 – (4) = 6

Market Equilibrium



- Total Revenue (TR) = P * Q
- $6 * 4 = $24

Market Equilibrium

Price Controls

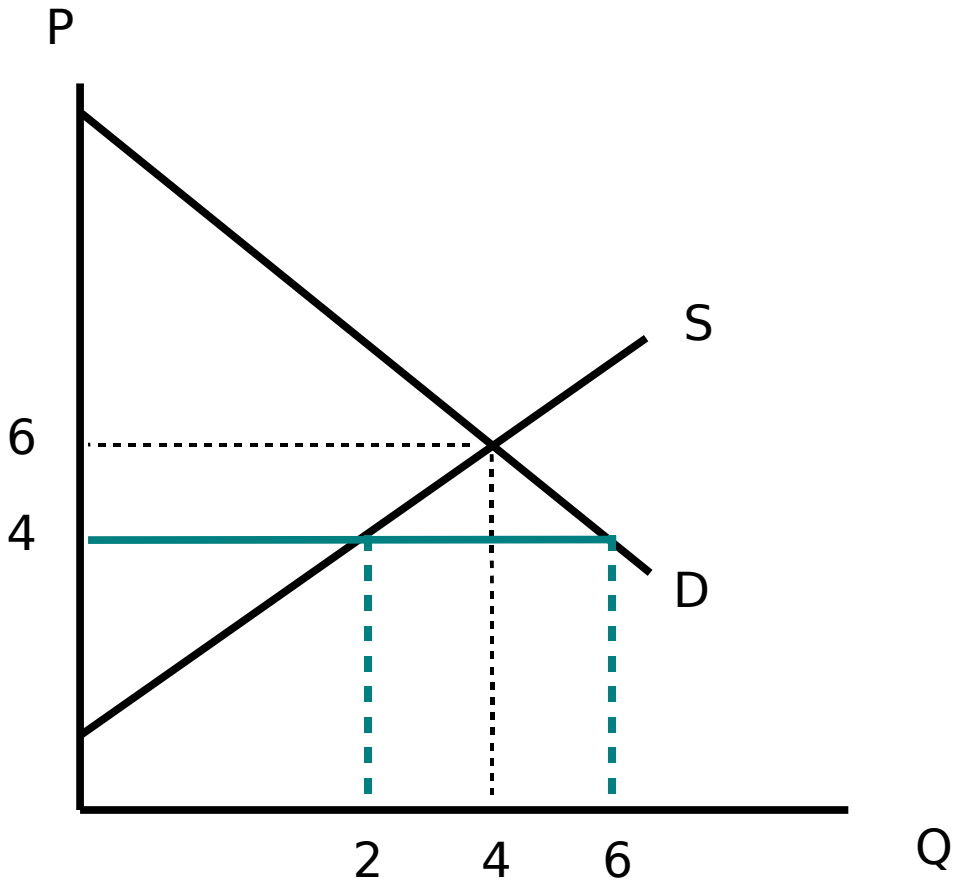
- Not uncommonly, governments impose price controls on markets.
- These price controls dictate that all transactions must occur at a set price.

Market Equilibrium

Price Controls

- This set price can be above or below the market price.
- Price controls cause shortages or surpluses thus a misallocation of resources.

Market Equilibrium
Price Controls



- Price Ceiling

  At $4, quantity supplied is 2 and quantity demanded is 6, thus leaving a shortage of 4.

  Price is set below equilibrium price.

Market Equilibrium
Price Controls

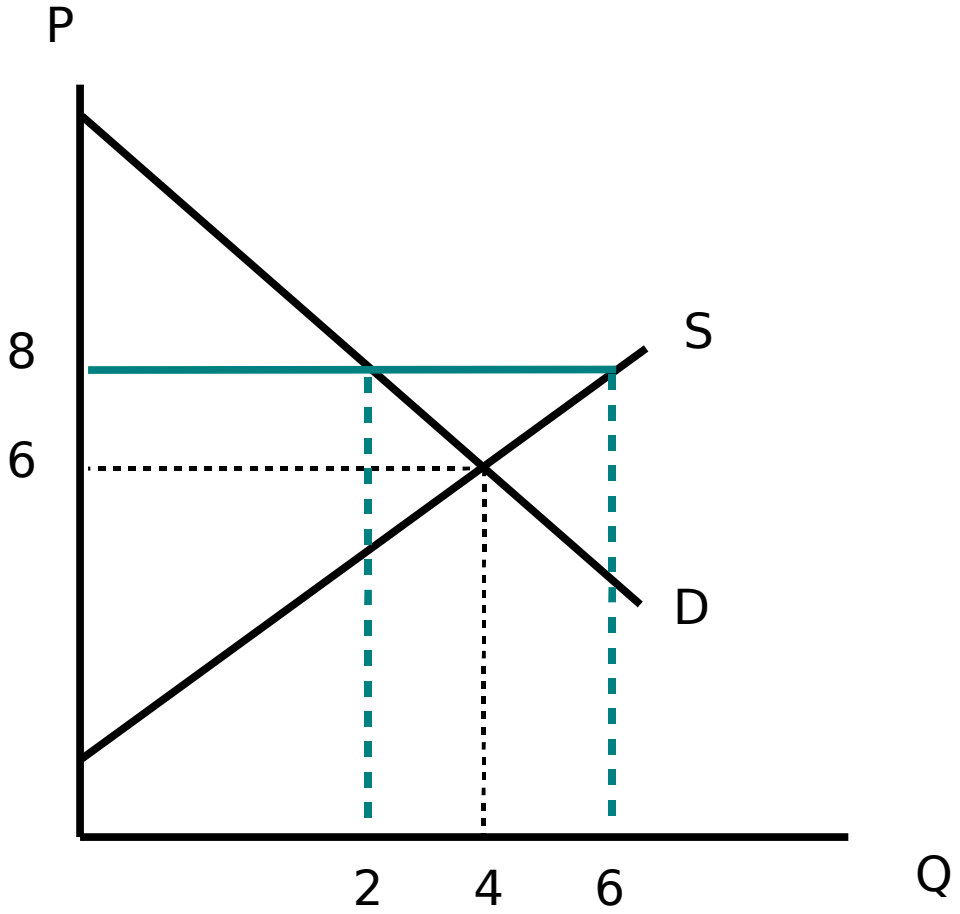
Price Ceiling Calculations

- Solve for Q, given P.

$$4 = 2 + Q: Q_s = 2$$

$$4 = 10 - Q: Q_d = 6$$

Market Equilibrium
Price Controls



- Price Floor
  - At $8, quantity demanded is 2 and quantity supplied is 6, thus leaving a 4 unit surplus.
  - The gov't will spend $8 * 4 = $32 to support this price.
  - Price is above equilibrium.

Market Equilibrium
Price Controls

Price Floor Calculations

- Solve for Q, given P.

$8 = 2 + Q$: $Q_s = 6$

$8 = 10 - Q$: $Q_d = 2$

Market Equilibrium

Two basic questions arise concerning market equilibrium:

- How does the market adjust to a change in supply or demand?
- Is equilibrium stable?

Market Equilibrium

The question arises as to the stability of a market equilibrium. To answer that question one needs to understand how the market adjusts, one has to understand how a firm adjusts.

- Managers react to events.
- Managers do not view the entire market but only their firm's sales.

Market Equilibrium

- Most managers could not tell you if the market is in equilibrium.
- Managers can tell you if they have too much inventory or if sales have changed.

Market Equilibrium

- Given that many managers cannot influence demand, price is the only tool they have.
- From the supply side managers order based on past sales and current inventory levels.
- Inventory level becomes the key to how firms adjust to market changes.

Market Equilibrium

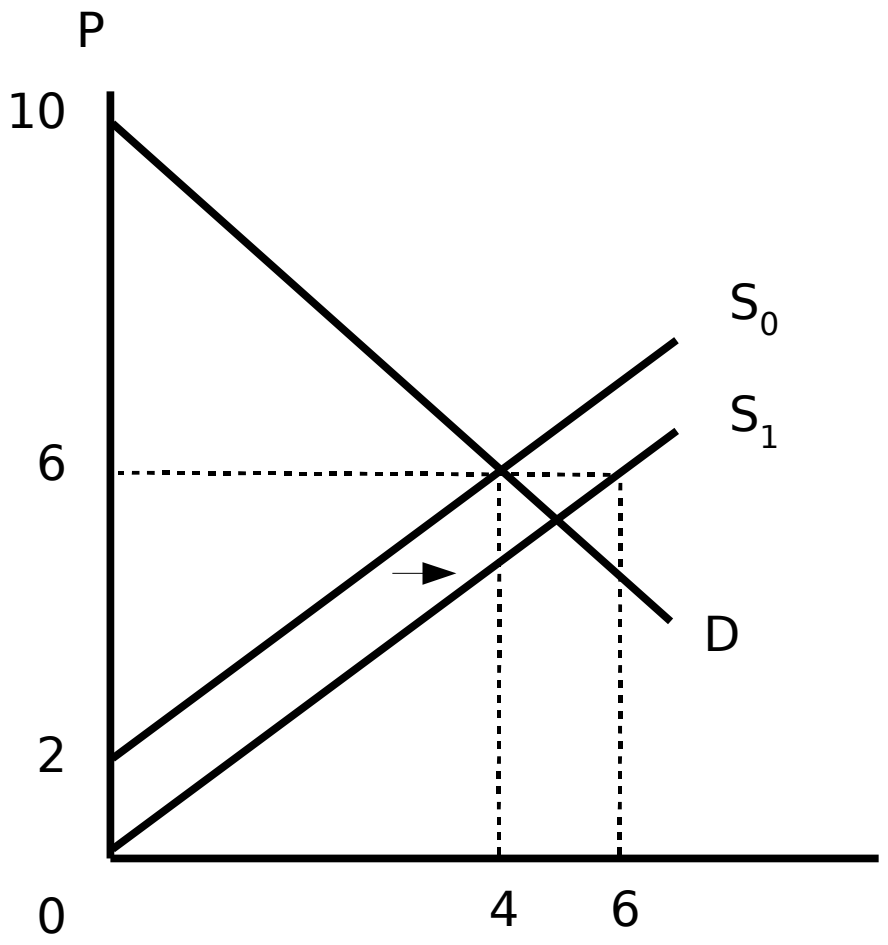
Inventory Control

- Too Much? Costs of supporting inventory
- Too Little? Sales lost from lack of product
- Just Right! Maintaining Sales/Inventory ratio

Market Equilibrium

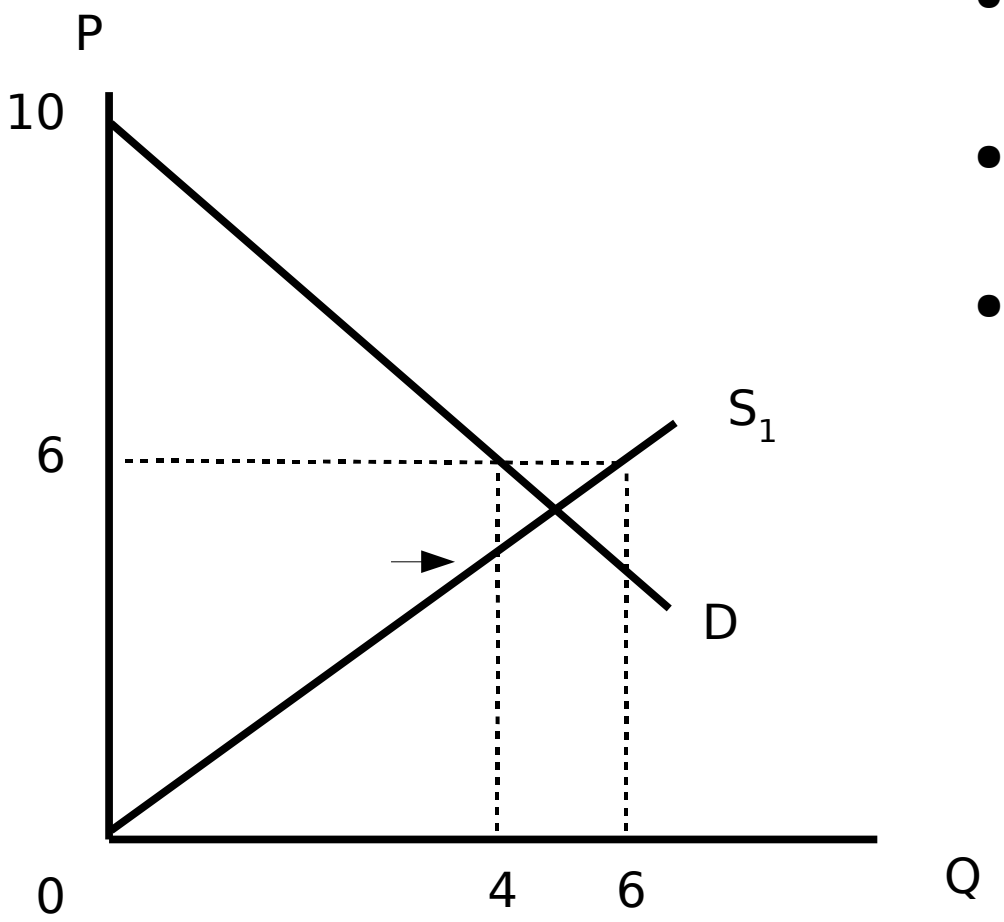
- Inventory Control
  - Too Much? Cut price, order less
  - Too Little? Raise price, order more

Market Adjustment Example



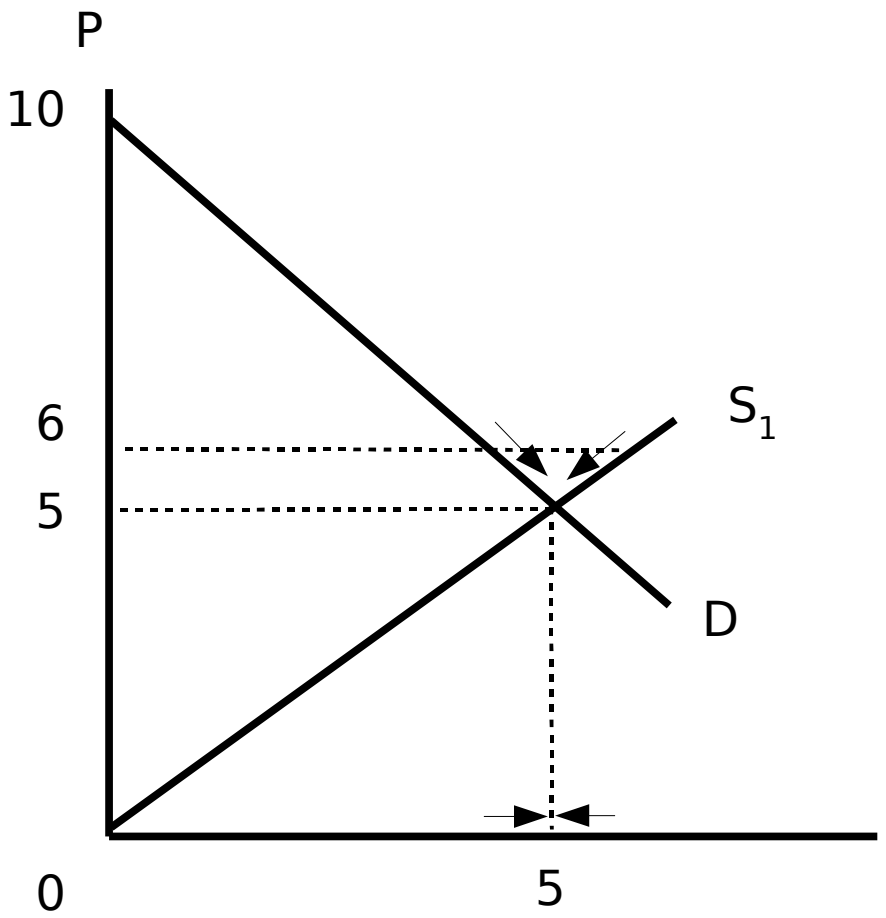
- There is an increase in supply.
- Supply increases two units at each price point.
- Supply: P = 0 + Q
- At P =\$6, Q_d= 4 but Q_s=6, surplus of 2

Market Adjustment Example



- $6 = Q_s$
- $6 = 10 - Q_d$: $Q_d = 4$
- Surplus: 6-4 = 2

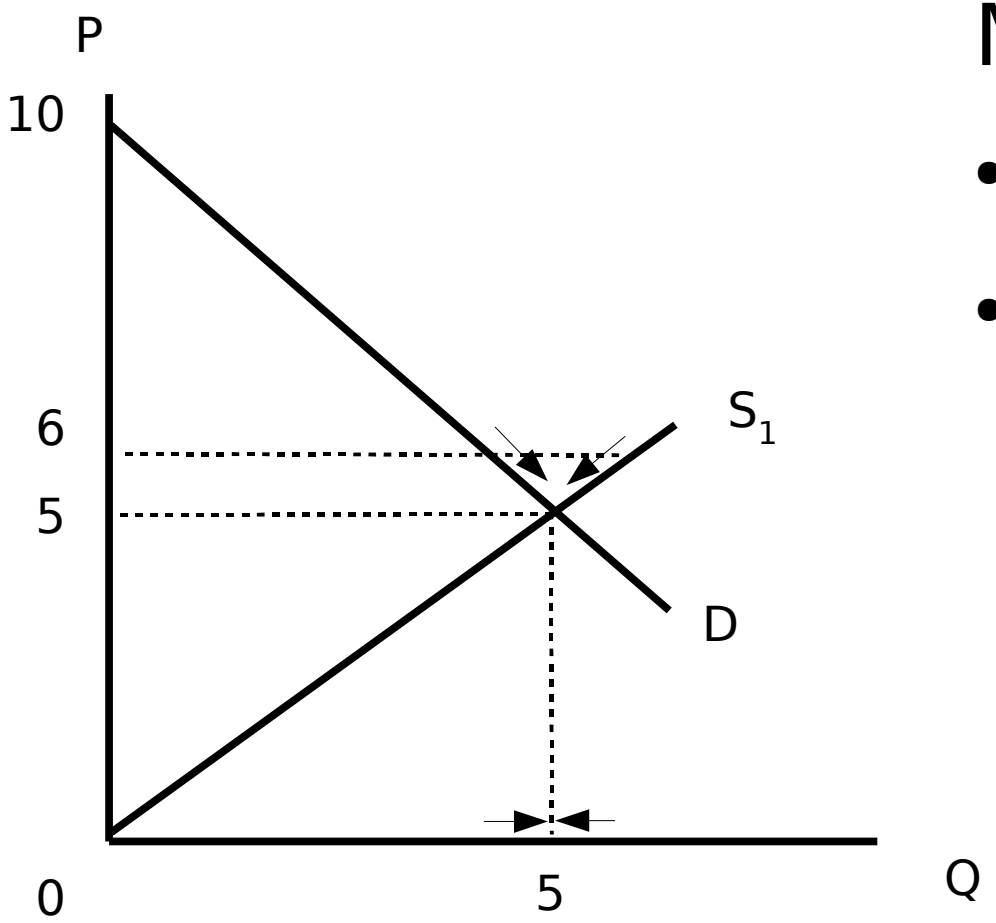
Market Adjustment Example



Process

- Cutting price causes quantity demanded to increase, and quantity supplied to decrease
- Until inventory/sales at normal level.

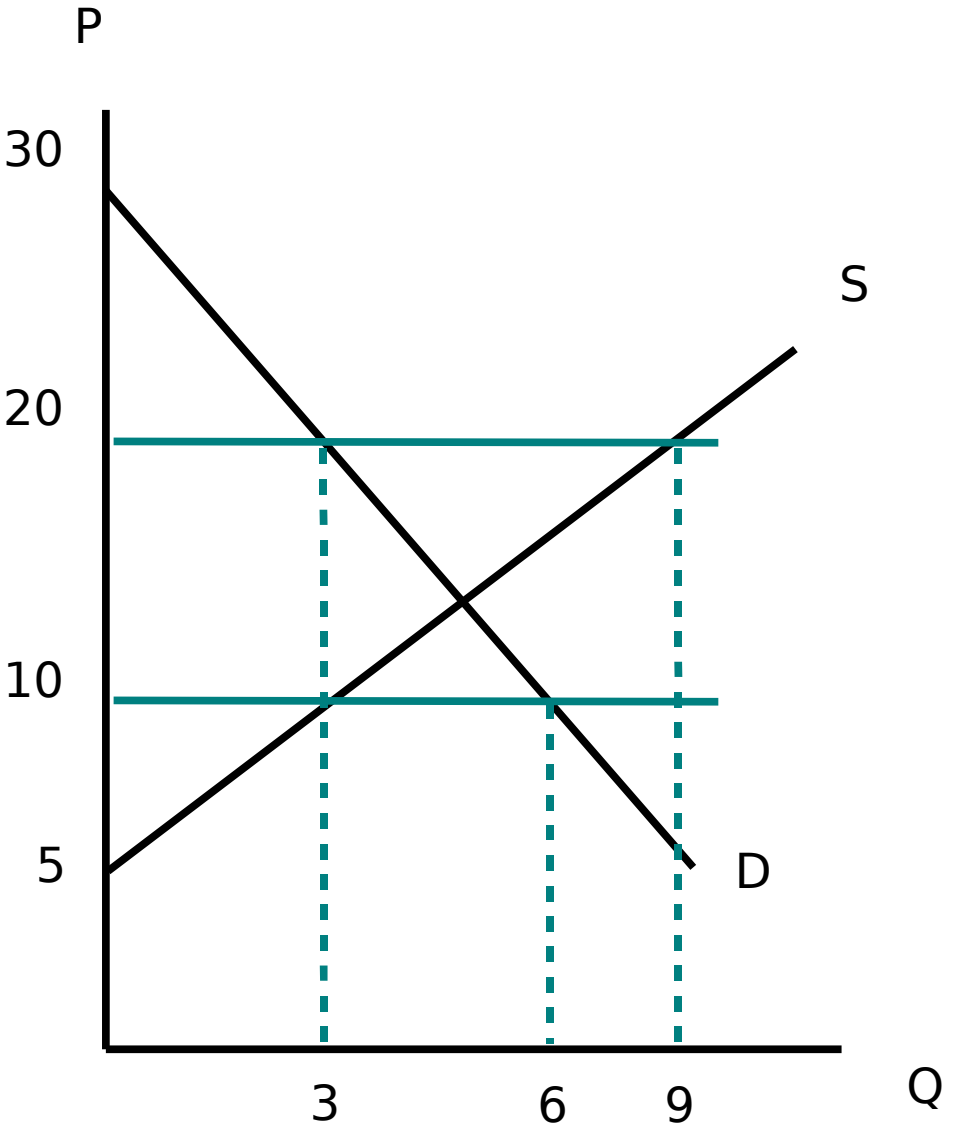
Market Adjustment Example



Math Solution

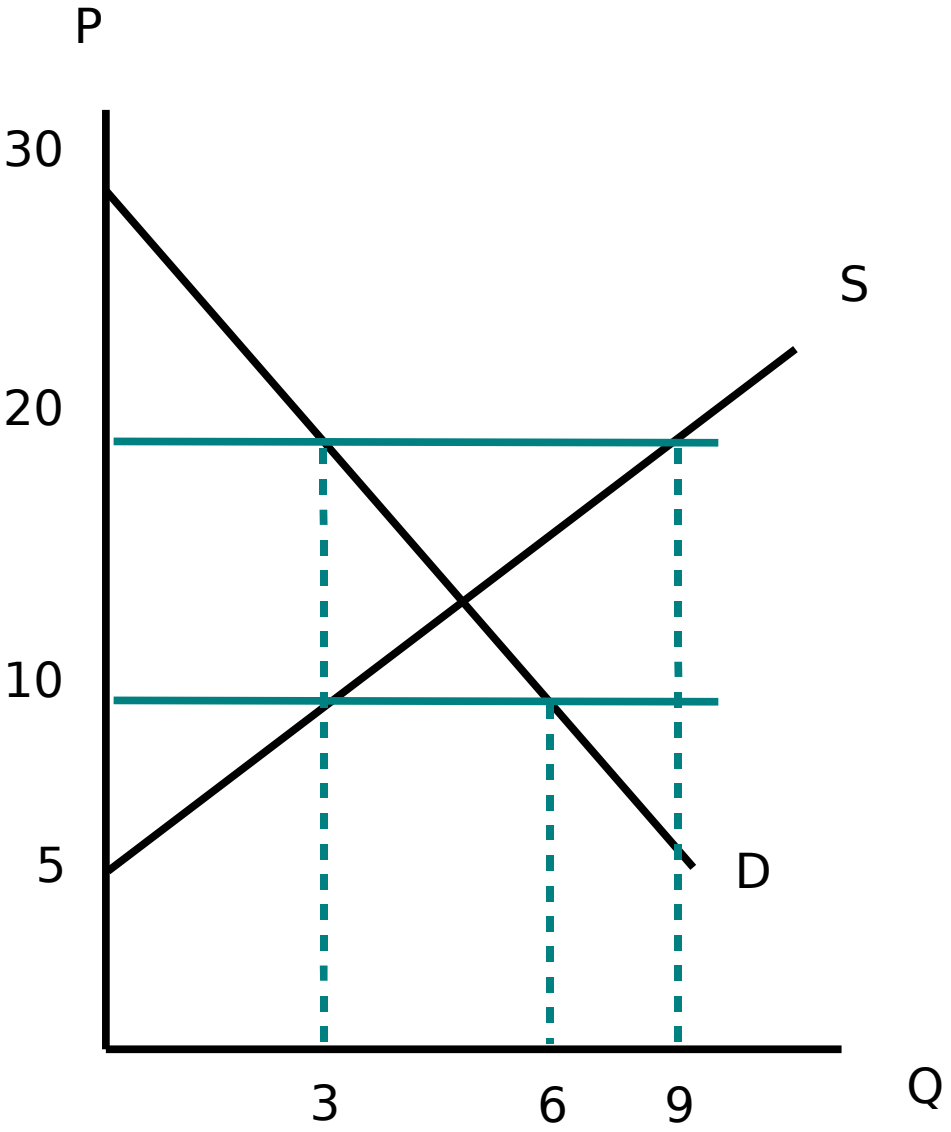
- Q = 10 - Q
- Q = 5, P = 5

Market Equilibrium Problem



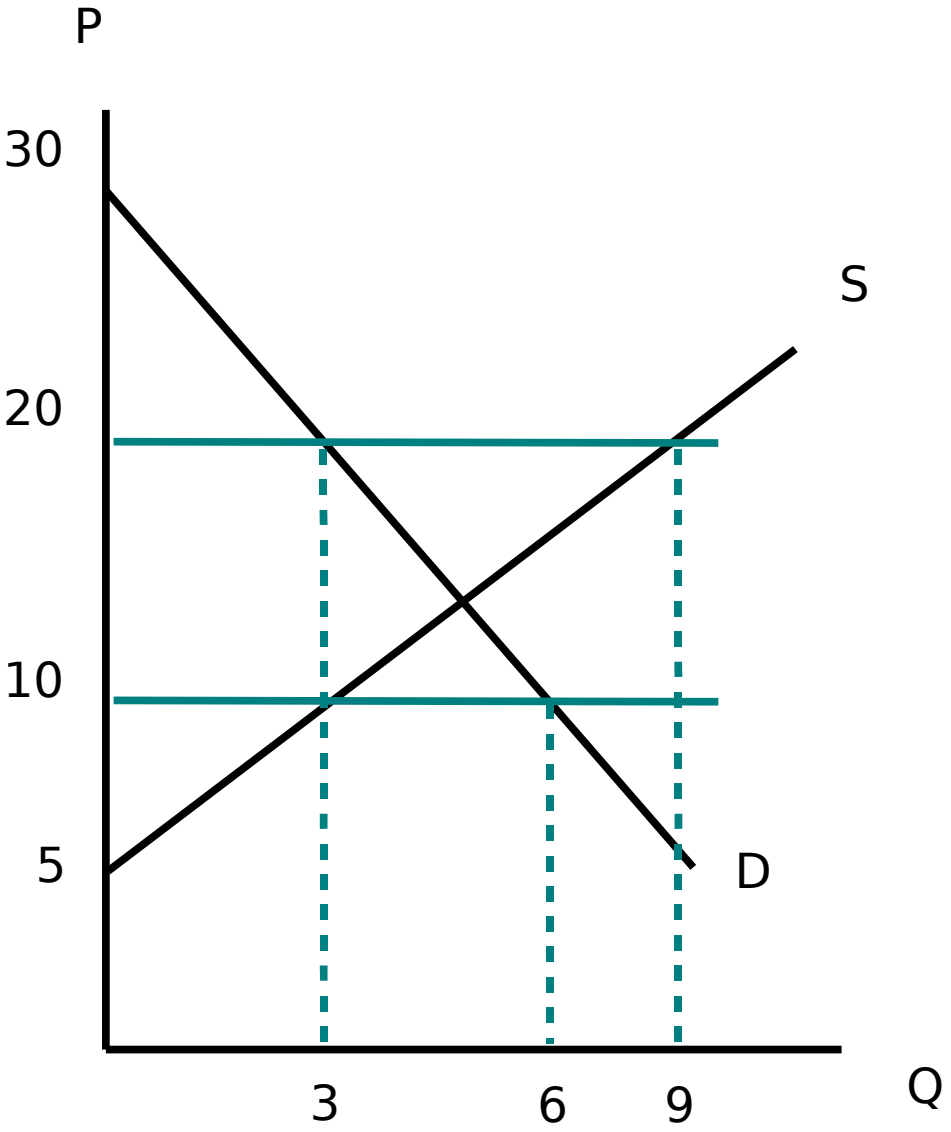
- What is the quantity demanded at P = 20?
- What is the quantity supplied at P = 20?
- At P = 20, what is the surplus or shortage?

Market Equilibrium Solution



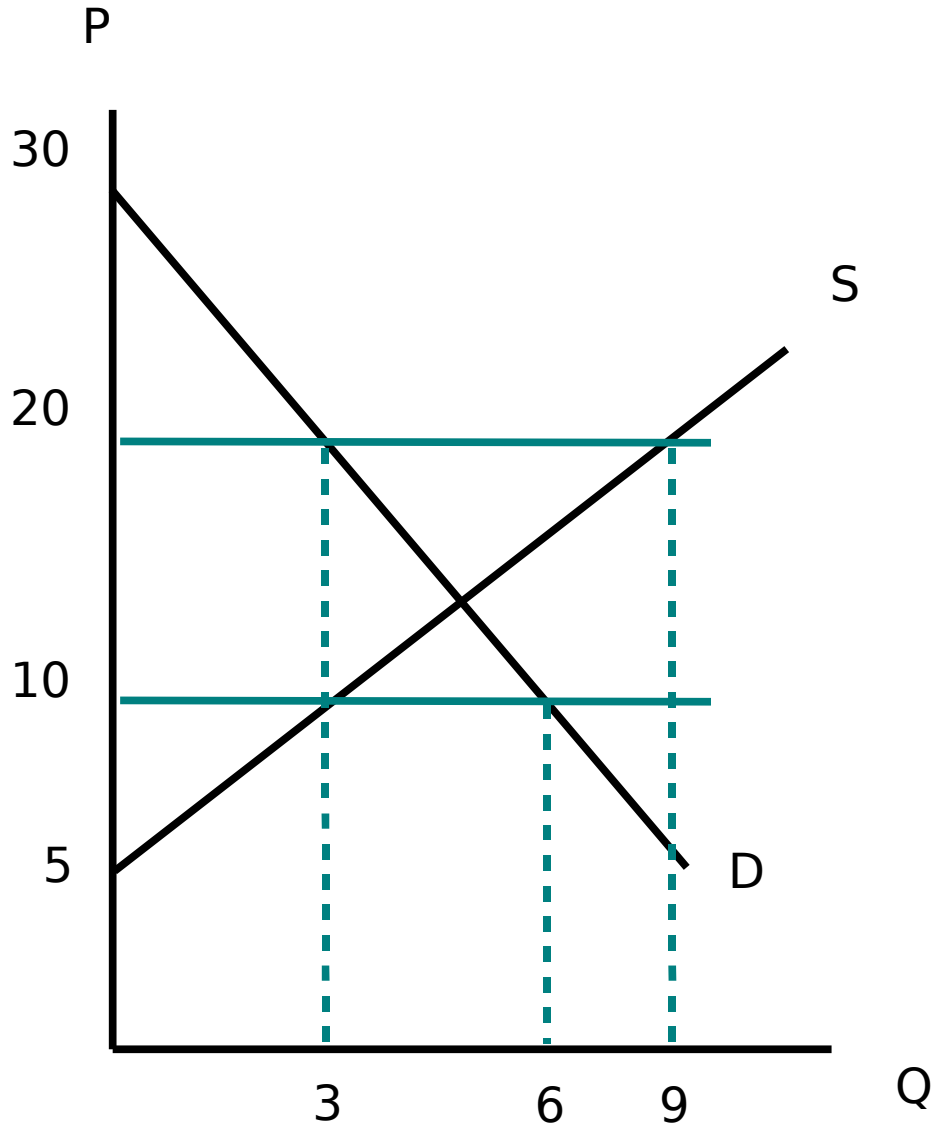
- The quantity demanded at P = 20 is 3.
- The quantity supplied at P = 20 is 9
- At P = 20, there is a surplus of 6, (9-3).

Market Equilibrium Problem



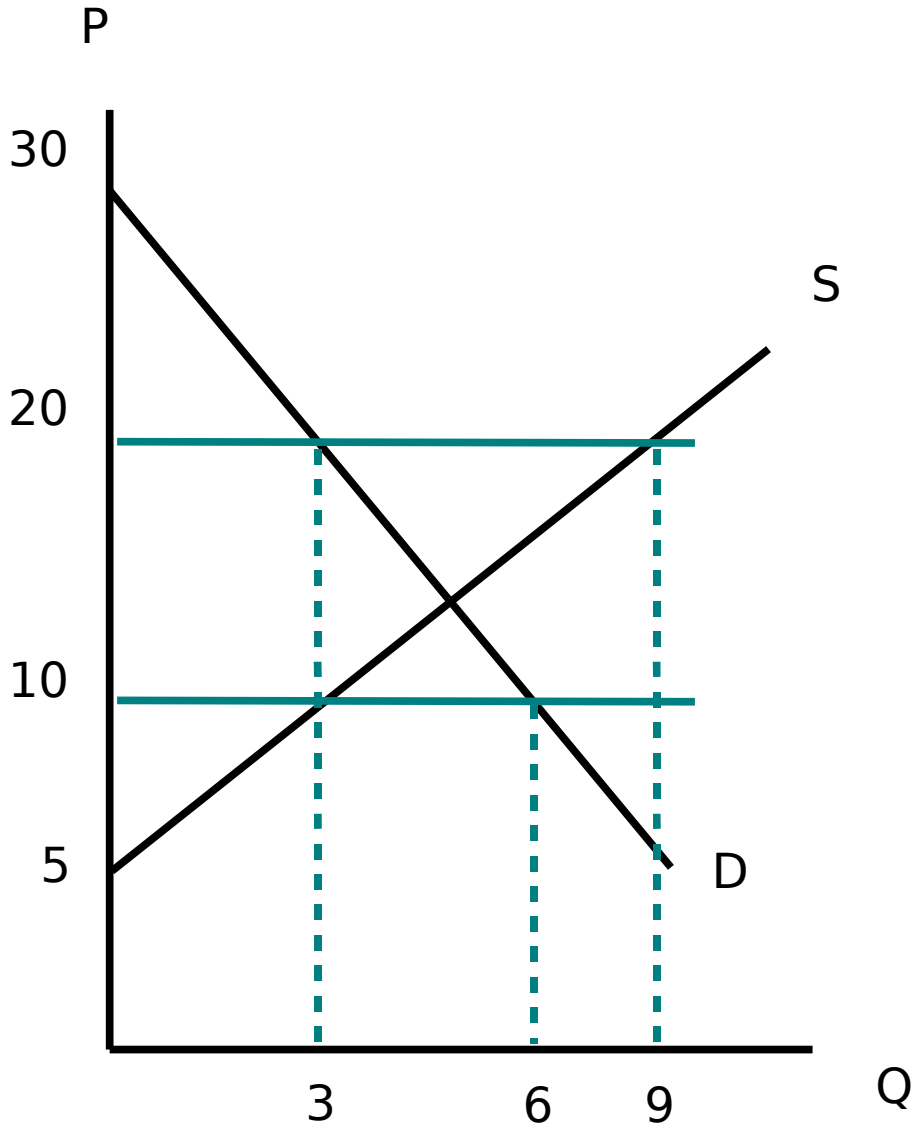
- What is the slope of the demand line?
- What is the vertical intercept of the demand line?
- What is the equation of the demand line?

Market Equilibrium Solution



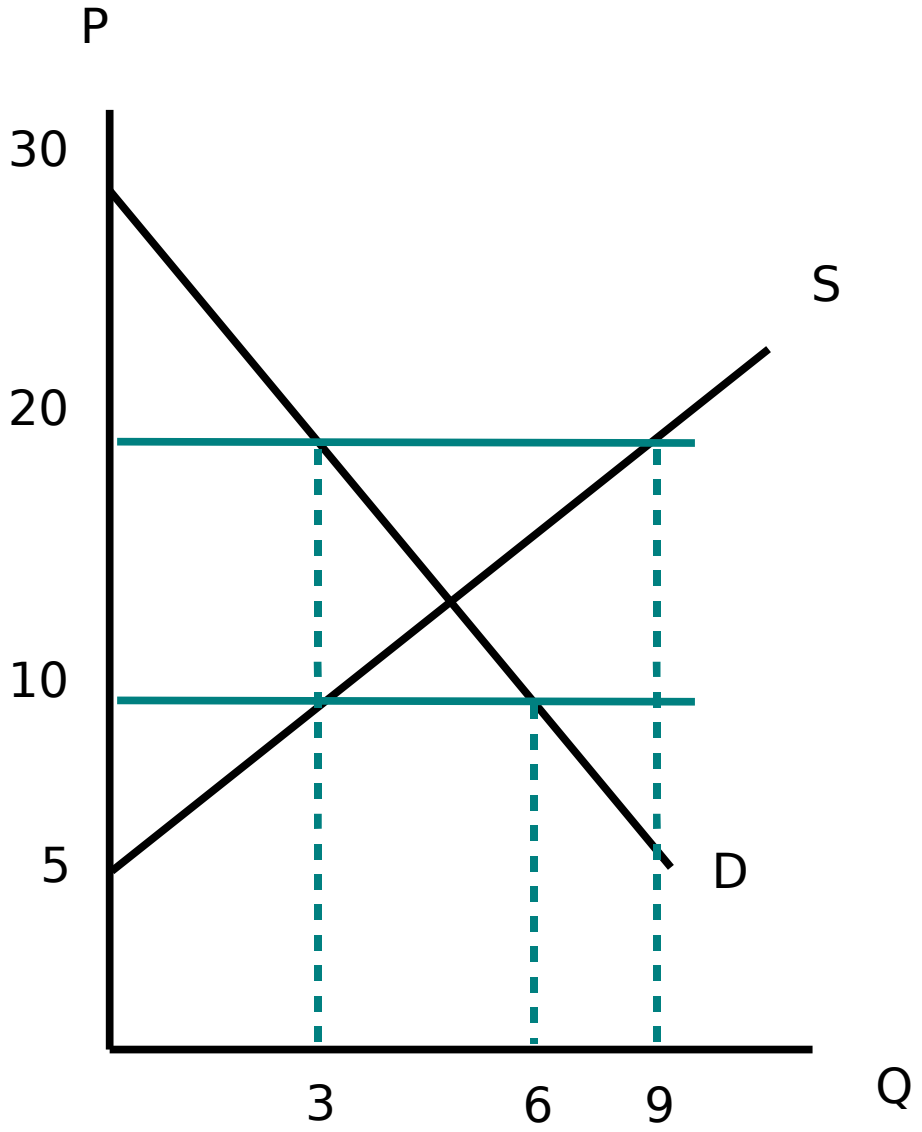
- The demand line slope is (20-10)/(3-6) = -3.3
- The demand line vertical intercept is 30.
- The demand equation is
  P = 30 - 3.3Q

Market Equilibrium Problem



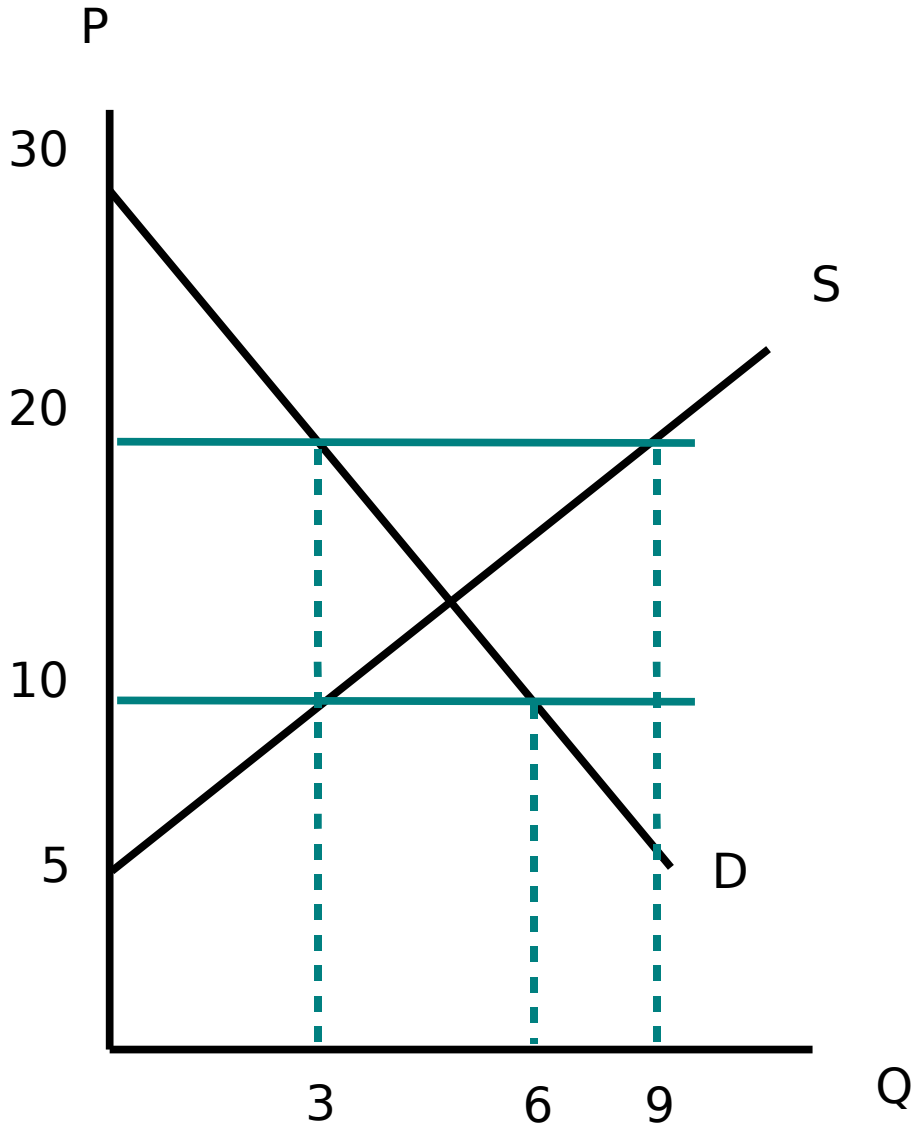
- What is the slope of the supply line?
- What is the vertical intercept of the supply line?
- What is the equation of the supply line?

Market Equilibrium Solution



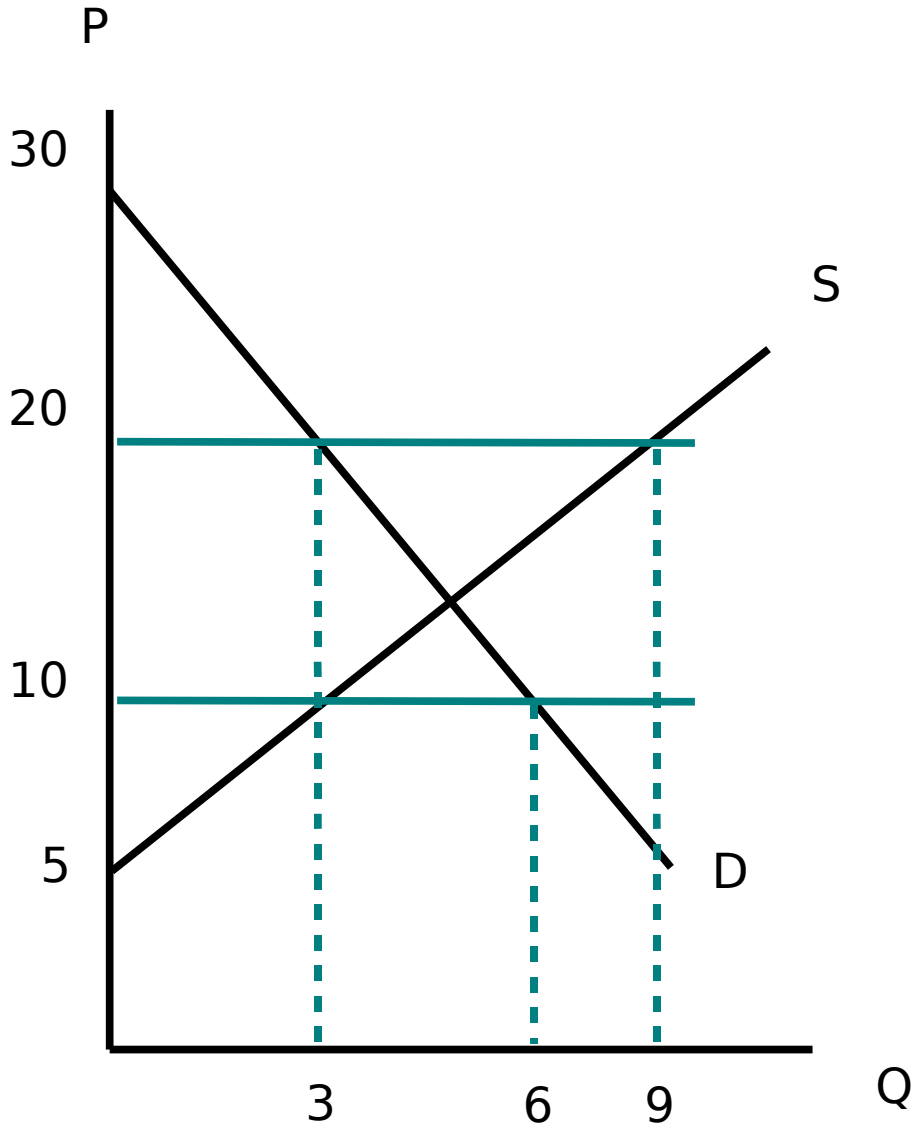
- The supply line slope supply is (10-20)/(3-9) = 1.67
- The vertical intercept of the supply line is 5.
- The equation of the supply line is $P = 5 + 1.67Q$

Market Equilibrium Problem



- What is the equilibrium price?
- What is the equilibrium quantity?

Market Equilibrium Solution



- The equilibrium price is $13.35
- The equilibrium quantity is 5

Market Assumptions

Market Assumptions

- Many buyers and sellers
- Free entry and exit
- Homogeneous goods
- No externalities
- No transactions costs (price searching)
- Information

Market Assumptions

Many buyers and sellers

- This is necessary to ensure that no one buyer nor one seller can set price, all are price takers.
- When either the buyer or the seller has an ability to determine price, then we say they have market power.

Market Assumptions

Many buyers and sellers: Example

- Suppose the market price of cafe au lait in Florida is $2.50. However, Starbucks now has the exclusive right to make cafe au lait, or anything like it, in the State of Florida.
- One cannot expect that the price will remain $2.50.
- In a competitive market, if prices (and profits) rise, competitors will arise.

Market Assumptions

Free Entry and Free Exit

- This assumption guarantees that there will be many suppliers without which a competitive market cannot be maintained.
- Firms will leave markets experiencing losses and enter markets experiencing profits. Firms will be more profitable and healthy.

Market Assumptions

Free Entry and Free Exit

- It also guarantees that resources in the economy will be available for the best use (economic efficiency).
- Ultimately, this ensures customers will be able to get what they want.

Market Assumptions

Free Entry and Free Exit: Example

- Let's say you can make either tea or coffee but not both. That is prohibited by the government.
- Once you make tea, you cannot leave that industry by selling or converting your assets.
- That means there is a risk in entering into either of these industries.

Market Assumptions

Free Entry and Free Exit: Example

- If you are in tea, and tea goes bad, you are stuck. Even while coffee is doing well.
- Because of this risk, firms will not enter the tea industry unless the profits are so high that can recover their investment costs quickly.
- Even though there isn't an entry barrier, the exit problem reduces entry.

Market Assumptions

Homogeneous Goods

- Since all goods are alike, it is difficult to justify charging a higher price.
- If a good had a higher quality than firms would charge more for it. In fact, many firms compete on the basis of product trying to accomplish that goal.

Market Assumptions

No Externalities

- There are no positive or negative externalities.
- An externality exists when a benefit or cost is imposed on a party outside of the transaction.

Market Assumptions

Externality Example: Property

- Positive: your property value goes up when your neighbor improves their property.
- Negative: your property value falls when your neighbor's property deteriorates.

Market Assumptions

No Transaction Costs

- There are assumed to be no transaction costs.
- Searching costs are the major transaction cost.
- Costs of searching for price are nonexistent or minimal. If price searching costs are substantial, customers may settle for higher prices.

Market Assumptions

Information

- It is assumed that buyer and seller each have the same information.
- If one had better information, it would be expected to be exploited. The other party may refuse to buy or sell, or may make a corresponding adjustment to the price to remove that advantage.

Economic Efficiency

Economic Efficiency

- Economic efficiency is necessary to improve the standard of living, and to maximize societal welfare.

Economic Efficiency

Types of Economic Efficiency

- Productional Efficiency
- Allocational Efficiency

Economic Efficiency

Productional Efficiency

- Goods are produced at the lowest per unit cost.
- Uses the fewest resources to build each unit.

Economic Efficiency

Allocational Efficiency

- Goods are priced to cover normal operating profit and cost.
- Consumer pays lowest price.
- Consumer is able to save money to pay for other goods.

Economic Efficiency

- A competitive market maximizes economic efficiency and therefore maximizes societal welfare.
- A good economic policy would seek to encourage the development of competitive markets.

Economic Efficiency

- Role of Profit in Allocating Capital
  - Firms and capital leave markets/industries experiencing economic losses, enter markets/ industries experiencing economic profit.
  - For a new industry to grow, another industry must die.
  - Capital is moved to its best use thus facilitating economic growth.

Economic Efficiency

Errata Comments

- It is in the best interest of firms to provide products that consumers want at a price that they can afford.
- Problems occur when assumptions are violated such as the case where assymetric information exists allowing firms to exploit consumers.

The End

(of supply & demand)