ECONOMICS

MICROECONOMICS

- Basic Economic concepts
- Supply, Demand and Market
- **Elasticity**
- Supply, Demand & Government Policies
- Production and Cost
- Market structures

MACROECONOMICS

- National Income accounting
- ASAD
- Inflation and Unemployment
- Financial, Monetary and Banking system
- Macroeconomics Policies

ELASTICITY

$$Q_A = f(P_A, P_B, P_C, I, A,...)$$

Elasticity: the **responsiveness** of demand/supply due to the change in its determinants
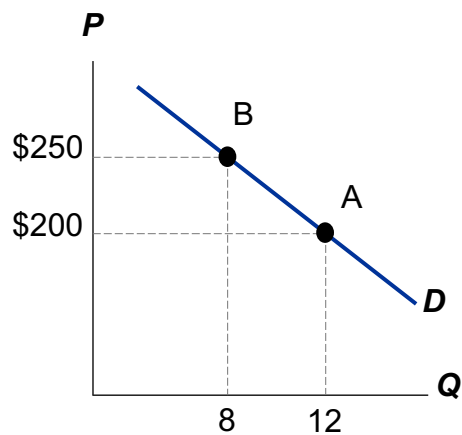
- Own Price Elasticity of Demand/supply

- Cross price elasticity of Demand: complement or substitute

- Income Elasticity of Demand: Normal, luxury or inferior goods

$$\varepsilon = \frac{\%\ change\ in\ quantity\ demanded/supplied}{\%\ change\ in\ its\ determinant} = \frac{\%\Delta Q}{\%\Delta X}$$

Calculating Percentage Changes

Demand for your website

P

$250

$200

B

A

D

Q

8   12

Going from A to B:
- the % change in P = ($250–$200)/$200 = 25%
- the % change in Q = - 33%
- Price elasticity = 33/25 = **1.33**

Going from B to A:
- the % change in P (250-200)/250 = - 20%
- the % change in Q (12-8)/8 = 50%
- Price elasticity = 50/20 = **2.5**

Mid-point

$$e = \frac{(Q_2-Q_1)/((Q_2+Q_1)/2)}{(P_2-P_1)/((P_2+P_1)/2)}$$

Use mid-point for consistency

3

3

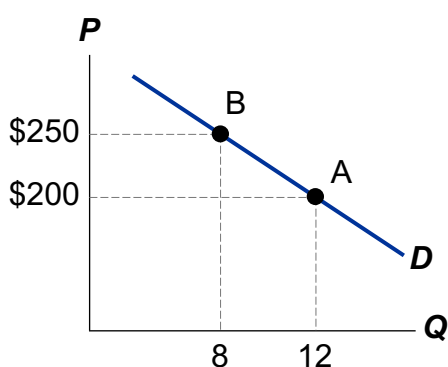# Calculating Percentage Changes

Using the midpoint method of computing % changes:

Demand for your websites

P

$250

$200

B

A

D

Q

8   12

$$e = \frac{(Q_2-Q_1)/((Q_2+Q_1)/2)}{(P_2-P_1)/((P_2+P_1)/2)}$$

$$\% \text{ change in P} = \frac{\$250 - \$200}{\$225} \times 100\% = 22.2\%$$
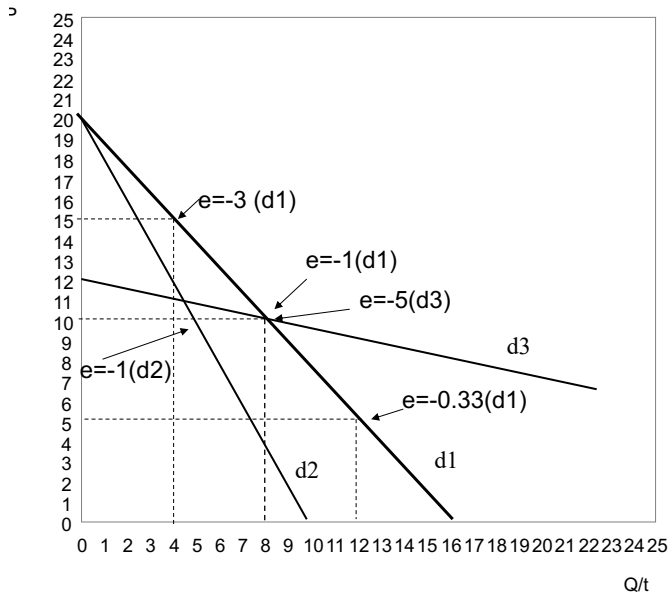
$$\% \text{ change in Q} = \frac{12 - 8}{10} \times 100\% = 40\%$$

$$\text{Price elasticity} = \frac{40\%}{22.2\%} = 1.8$$

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Elasticity of Demand: Arc and Point
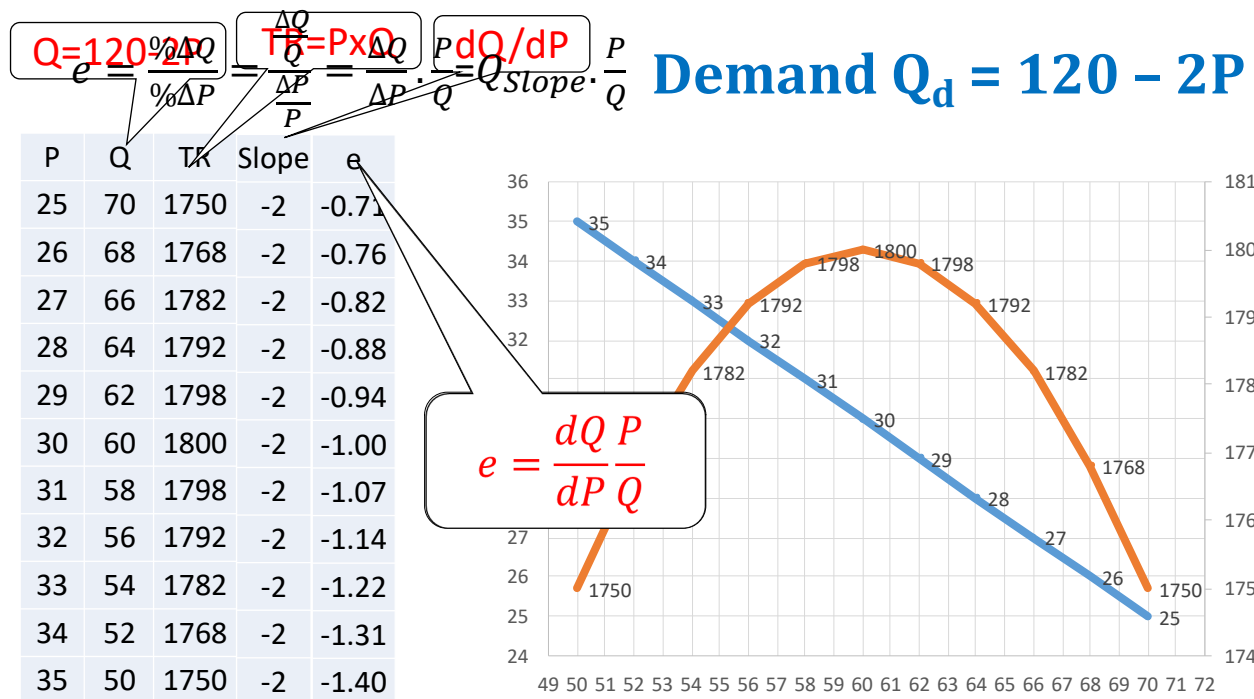

Demand: $Q = f(P)$

Arc Elasticity

$$e = \frac{\Delta Q}{(Q_1 + Q_2)/2} \div \frac{\Delta P}{(P_1 + P_2)/2}$$

Point Elasticity

$$e = \frac{\%\Delta Q}{\%\Delta P} = \frac{\frac{\Delta Q}{Q}}{\frac{\Delta P}{P}} = \frac{\Delta Q}{\Delta P} \cdot \frac{P}{Q} = Q_{Slope} \cdot \frac{P}{Q}$$

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$$Q=120 \quad e = \frac{\%\Delta Q}{\%\Delta P} = \frac{\frac{\Delta Q}{Q}}{\frac{\Delta P}{P}} = \frac{\Delta Q}{\Delta P} \cdot \frac{P}{Q} = Q_{Slope} \cdot \frac{P}{Q}$$

TR=PxQ   dQ/dP

Demand Q_d = 120 – 2P

P	Q	TR	Slope	e
25	70	1750	-2	-0.71
26	68	1768	-2	-0.76
27	66	1782	-2	-0.82
28	64	1792	-2	-0.88
29	62	1798	-2	-0.94
30	60	1800	-2	-1.00
31	58	1798	-2	-1.07
32	56	1792	-2	-1.14
33	54	1782	-2	-1.22
34	52	1768	-2	-1.31
35	50	1750	-2	-1.40

$$e = \frac{dQ}{dP}\frac{P}{Q}$$

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Demand $Q_d = 120 - 2P$

Total revenue

P	Q	TR	Slope	e	e
25	70	1750	-2	-0.71	
26	68	1768	-2	-0.76	
27	66	1782	-2	-0.82	Inelastic
28	64	1792	-2	-0.88	
29	62	1798	-2	-0.94	
30	60	1800	-2	-1.00	unit
31	58	1798	-2	-1.07	
32	56	1792	-2	-1.14	
33	54	1782	-2	-1.22	elastic
34	52	1768	-2	-1.31	
35	50	1750	-2	-1.40	
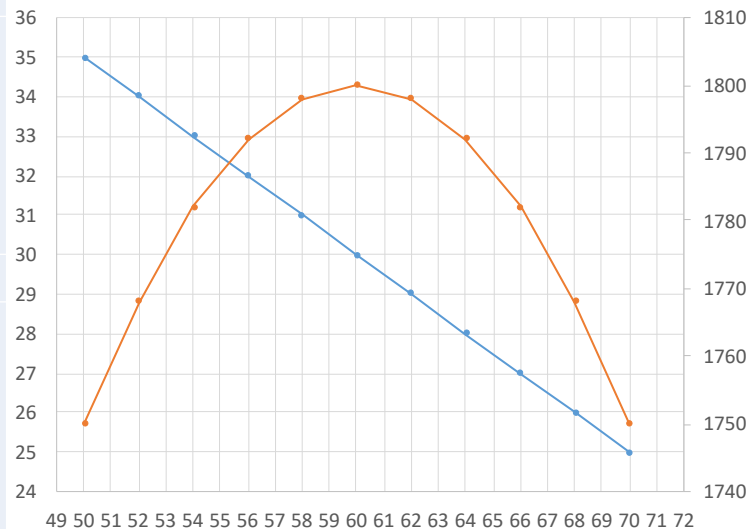
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Elasticity of Demand

- **Variety of demand curves**
  - Demand is **elastic**
    - Price elasticity of demand > 1
  - Demand is **inelastic**
    - Price elasticity of demand < 1
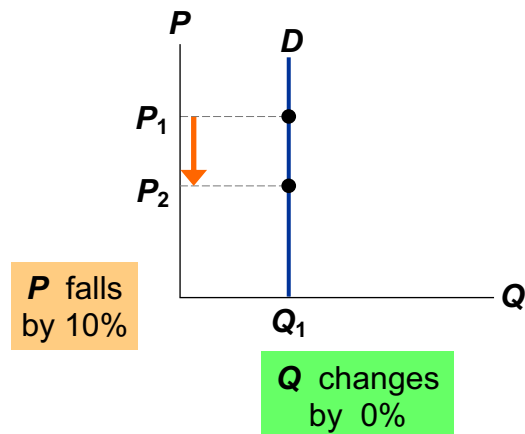 - Demand has **unit elasticity**
    - Price elasticity of demand = 1

- **Variety of demand curves**
  - Demand is **perfectly inelastic**
    - Price elasticity of demand = 0
    - Demand curve is vertical
  - Demand is **perfectly elastic**
    - Price elasticity of demand = infinity
    - Demand curve is horizontal
- The flatter the demand curve
  - The greater the price elasticity of demand

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Perfectly inelastic demand

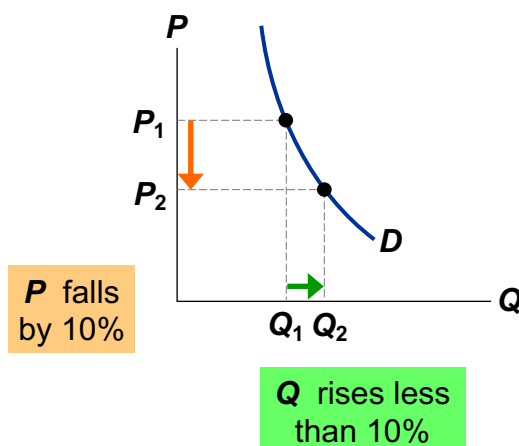$$\text{Price elasticity of demand} = \frac{\%\ \text{change in } Q}{\%\ \text{change in } P} = \frac{0\%}{10\%} = 0$$

- D curve : Vertical

- Consumers' price sensitivity: None

- Elasticity: 0

P falls by 10%

Q changes by 0%

Inelastic demand

$$\text{Price elasticity of demand} = \frac{\%\ \text{change in } Q}{\%\ \text{change in } P} = \frac{<10\%}{10\%} < 1$$

- D curve: relatively steep

- Consumers' price sensitivity:
- relatively low

- Elasticity:<1

P falls by 10%

Q rises less than 10%

Unit elastic demand

$$\text{Price elasticity of demand} = \frac{\% \text{ change in } Q}{\% \text{ change in } P} = \frac{10\%}{10\%} = 1$$
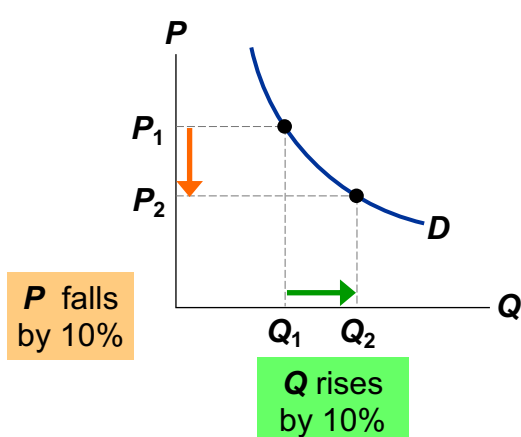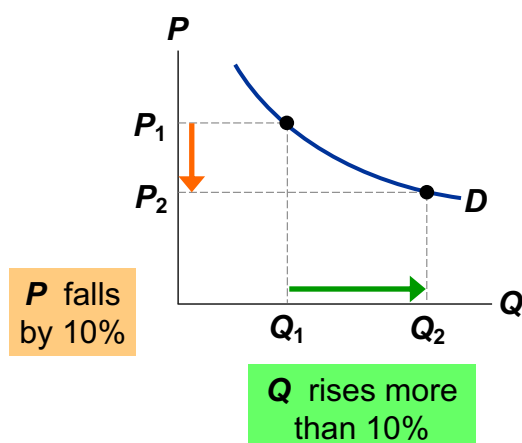
P

P_1

P_2

D

Q

Q_1 Q_2

P falls by 10%

Q rises by 10%

- D curve: intermediate slope

- Consumers' price sensitivity: intermediate

- Elasticity: =1

Elastic demand

$$\text{Price elasticity of demand} = \frac{\% \text{ change in } Q}{\% \text{ change in } P} = \frac{>10\%}{10\%} > 1$$
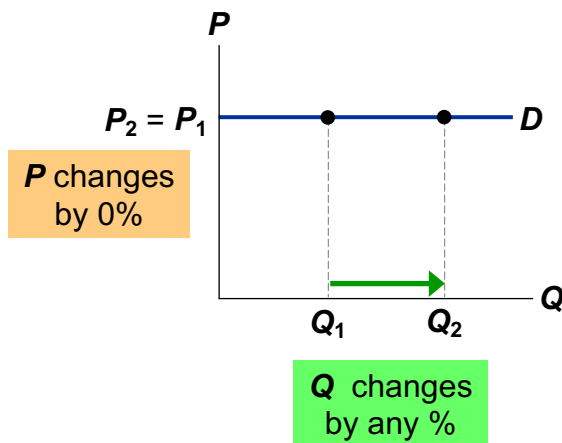
P

P_1

P_2

D

Q

Q_1 Q_2

P falls by 10%

Q rises more than 10%

- D curve: relatively flat

- Consumers' price sensitivity: relatively high

- Elasticity: >1

Perfectly elastic demand

$$\text{Price elasticity of demand} = \frac{\%\text{ change in } Q}{\%\text{ change in } P} = \frac{\text{any }\%}{0\%} = \text{infinity}$$
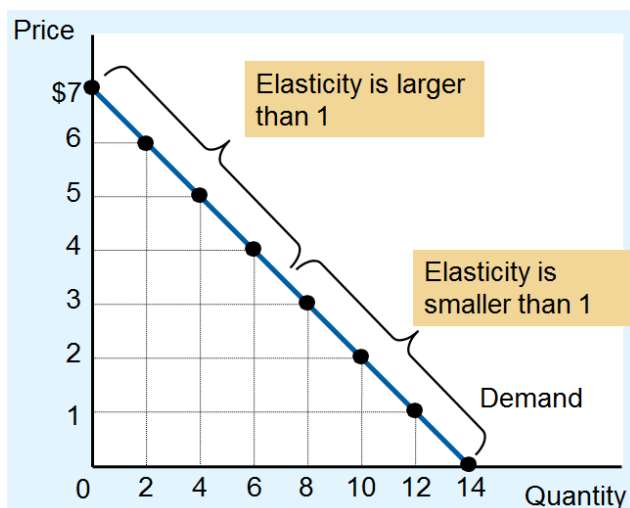

$P_2 = P_1$

P changes by 0%

D

Q_1 Q_2

Q changes by any %

- D curve: horizontal

- Consumers' price sensitivity: extreme

- Elasticity: infinity

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Elasticity along a Linear Demand Curve

Price

$7

Elasticity is larger than 1

Elasticity is smaller than 1

Demand

Quantity

- The slope of a linear demand curve is constant, but its elasticity is not.
- At points with a low price and high quantity, the demand curve is inelastic.
- At points with a high price and low quantity, the demand curve is elastic.

1. The price elasticity of demand measures
a.   buyers' responsiveness to a change in the price of a good.
b.   the extent to which demand increases as additional buyers enter the market.
c.   how much more of a good consumers will demand when incomes rise.
d.   the movement along a supply curve when there is a change in demand.

2. Economists compute the price elasticity of demand as the
a.   percentage change in price divided by the percentage change in quantity demanded.
b.   change in quantity demanded divided by the change in the price.
c.   percentage change in quantity demanded divided by the percentage change in price.
d.   percentage change in quantity demanded divided by the percentage change in income.

3. If the price elasticity of demand for a good is 0.2, then a 3 percent decrease in price results in a
a.   0.6 percent increase in the quantity demanded.
b.   1.5 percent increase in the quantity demanded.
c.   2 percent increase in the quantity demanded.
d.   6 percent increase in the quantity demanded.

4. Elasticity of demand is closely related to the slope of the demand curve. The less responsive buyers are to a change in price, the
a.   steeper the demand curve will be.
b.   flatter the demand curve will be.
c.   further to the right the demand curve will sit.
d.   closer to the vertical axis the demand curve will sit.

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5. The smaller the price elasticity of demand, the
a.   steeper the demand curve will be through a given point.
b.   flatter the demand curve will be through a given point.
c.   more strongly buyers respond to a change in price between any two prices P1 and P2.
d.   smaller the decrease in equilibrium price when the supply curve shifts rightward from S1 to S2.

6. As we move downward and to the right along a linear, downward-sloping demand curve,
a.   both slope and elasticity remain constant.
b.   slope changes but elasticity remains constant.
c.   both slope and elasticity change.
d.   slope remains constant but elasticity changes.

7. Demand is said to be inelastic if
a.   buyers respond substantially to changes in the price of the good.
b.   demand shifts only slightly when the price of the good changes.
c.   the quantity demanded changes only slightly when the price of the good changes.
d.   the price of the good responds only slightly to changes in demand.

8. When the price of bubble gum is $0.50, the quantity demanded is 400 packs per day. When the price falls to $0.40, the quantity demanded increases to 600. Given this information and using the midpoint method, we know that the demand for bubble gum is
a.   inelastic.
b.   elastic.
c.   unit elastic.
d.   perfectly inelastic.

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Determinants of Elasticity

- **Necessities vs. luxuries**
  - *necessities* : Some goods are so critical, Demand for necessities is relatively inelastic.
  - A *luxury good* is something we'd like to have but aren't likely to buy unless our income jumps or the price declines sharply.
- **Availability of substitutes:** The greater the availability of substitutes, the higher the price elasticity of demand.
- **Relative price:** Elasticity increases as the price of the product increases relative to the consumer's income.
- **Definition of the market**
  - Narrowly defined markets: more elastic demand
- **Time horizon**
  - Demand is more elastic over longer time horizons

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Enterprise want their product inelastic because when they increase the price, the demand does not fluctuate much

9. For a good that is a necessity,
a. quantity demanded tends to respond substantially to a change in price.
b. demand tends to be inelastic.
c. the law of demand does not apply.
d. All of the above are correct.

10. Suppose the price of potato chips decreases from \$1.45 to \$1.25 and, as a result, the quantity of potato chips demanded increases from 2,000 to 2,200. Using the midpoint method, the price elasticity of demand for pota-to chips in the given price range is
a. 2.00.
b. 1.55.
c. 1.00.
d. 0.64.

11. A person who takes a prescription drug to control high cholesterol most likely has a demand for that drug that is
a. inelastic.
b. unit elastic.
c. elastic.
d. highly responsive to changes in income.

12. Studies indicate that the price elasticity of demand for cigarettes is about 0.4. A government policy aimed at reducing smoking changed the price of a pack of cigarettes from \$2 to \$6. According to the midpoint meth-od, the government policy should have reduced smoking by
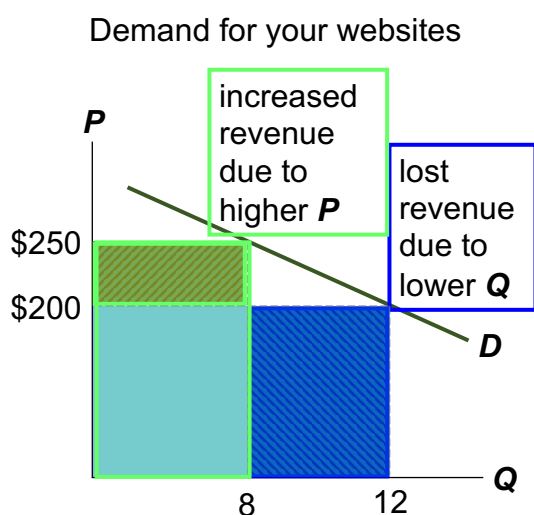a. 30%.
b. 40%.
c. 80%.
d. 250%.

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Price Elasticity and Total Revenue

- For a price increase, if demand is elastic
  - E > 1: % change in Q > % change in P
  - TR decreases: the fall in revenue from lower Q > the increase in revenue from higher P
- For a price increase, if demand is inelastic
  - E < 1: % change in Q < % change in P
  - TR increases: the fall in revenue from lower Q < the increase in revenue from higher P
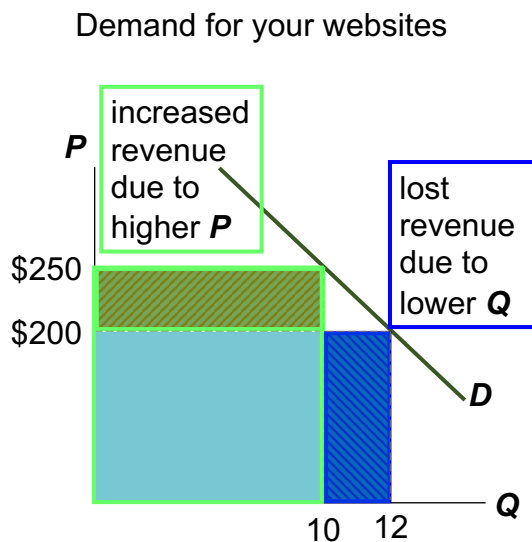
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Price Elasticity and Total Revenue

Demand for your websites

increased revenue due to higher **P**

lost revenue due to lower **Q**

$250

$200

P

D

Q

8   12

- Elastic demand (elasticity = 1.8)

- If **P** = $200, **Q** = 12, and revenue = $2400

- If **P** = $250, **Q** = 8, and revenue = $2000

- When **D** is elastic, a price increase causes revenue to fall.

20

20

Price Elasticity and Total Revenue

Demand for your websites

- Inelastic demand
  (elasticity = 0.82)

- If *P* = $200, *Q* = 12, and
  revenue = $2400

- If *P* = $250, *Q* = 10, and
  revenue = $2500

- When *D* is inelastic,
  a price increase causes
  revenue to rise.

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APPLICATION: Does Drug Interdiction Increase or Decrease Drug-Related Crime?

- One side effect of illegal drug use is crime: Users often turn to crime to finance their habit.

- We examine two policies designed to reduce illegal drug use and see what effects they have on drug-related crime.

- For simplicity, we assume the total dollar value of drug-related crime equals total expenditure on drugs.

- Demand for illegal drugs is inelastic, due to addiction issues.

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Policy 1: Interdiction

Interdiction reduces the
supply of drugs.

Since demand for drugs is
inelastic,
P rises propor-tionally
more than **Q** falls.

Result: an increase in
total spending on drugs, and in
drug-related crime

new value of drug-
related crime

initial value
of drug-
related
crime

Price of
Drugs

P_2

P_1

D_1

S_2

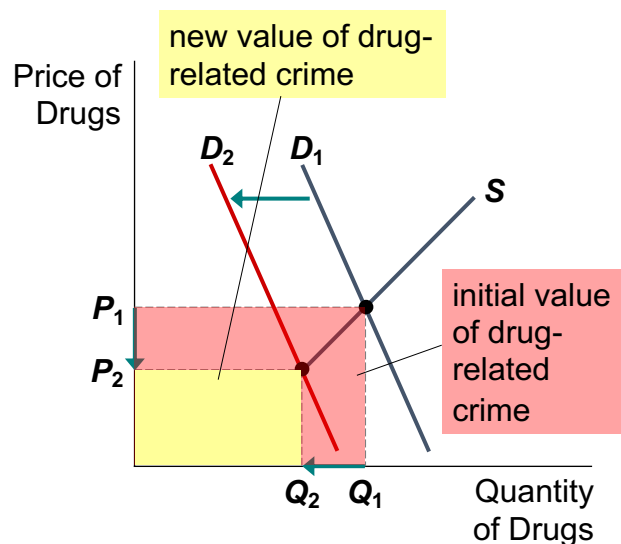S_1

Q_2 Q_1

Quantity
of Drugs
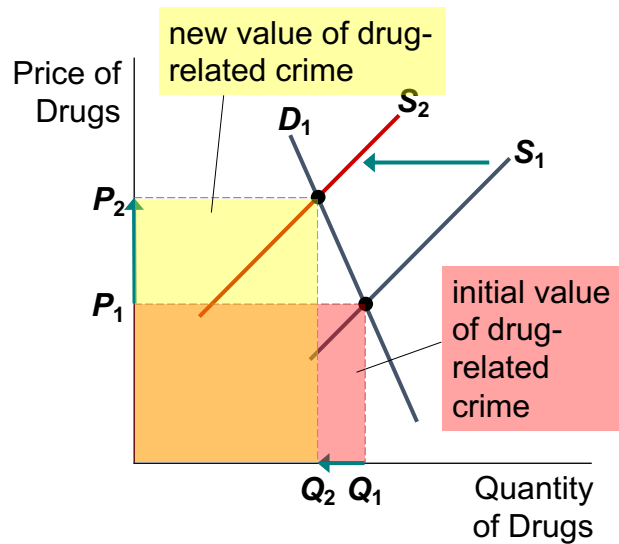
Policy 2: Education

Education reduces the
demand for drugs.

P and **Q** fall.

Result:
A decrease in total spending
on drugs, and in drug-related
crime.

new value of drug-
related crime

initial value
of drug-
related
crime

Price of
Drugs

P_1

P_2

D_2 D_1

S

Q_2 Q_1

Quantity
of Drugs

Income elasticity of demand

measures the response of Q^d to a change in consumer income

Income elasticity of demand	=	Percent change in Q^d / Percent change in income

- **Normal goods**: Positive income elasticity
  - Necessities: Smaller income elasticities
  - Luxuries: Large income elasticities
- **Inferior goods**: Negative income elasticities

Cross Price elasticity of demand

measures the response of demand for one good to changes in the price of another good

Cross-price elast. of demand	=	% change in Q^d for good 1 / % change in price of good 2

- **For substitutes**, cross-price elasticity > 0
  (e.*g*., an increase in price of beef causes an increase in demand for chicken)

- **For complements**, cross-price elasticity < 0
  (*e.g.*, an increase in price of computers causes decrease in demand for software)

Price elasticity of supply

- **Price elasticity of supply** measures how much Q^s responds to a change in P.

Price elasticity of supply	=	Percentage change in Q^s
		Percentage change in P

- Loosely speaking, it measures sellers' price-sensitivity.

- Again, use the midpoint method to compute the percentage changes.

The Elasticity of Supply

- Elastic supply
  - Quantity supplied responds substantially to changes in the price
- Inelastic supply
  - Quantity supplied responds only slightly to changes in the price
- Determinant of price elasticity of supply
  - Time period: Supply is more elastic in the long run
- Variety of supply curves:
  - Supply is unit elastic: Es = 1
  - Supply is elastic: Es > 1
  - Supply is inelastic: Es < 1
  - Supply is perfectly inelastic: Es = 0 Supply curve is vertical
  - Supply is perfectly elastic: Es = infinity Supply curve is horizontal

The Elasticity of Supply

- Computing price elasticity of supply
  - Percentage change in quantity supplied divided by percentage change in price
  - Always positive
- Midpoint method
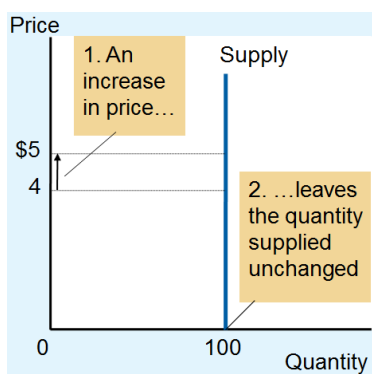 - Two points: (Q_1, P_1) and (Q_2, P_2)

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

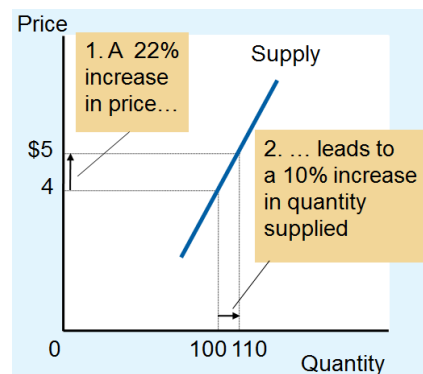The Price Elasticity of Supply (a, b)

(a) Perfectly Inelastic Supply:
   Elasticity Equals 0

Price

1. An increase in price…   Supply

$5
4   2. …leaves the quantity supplied unchanged

0   100
                          Quantity

(b) Inelastic Supply:
   Elasticity Is Less Than 1

Price

1. A 22% increase in price…   Supply

$5   2. … leads to a 10% increase in quantity supplied
4

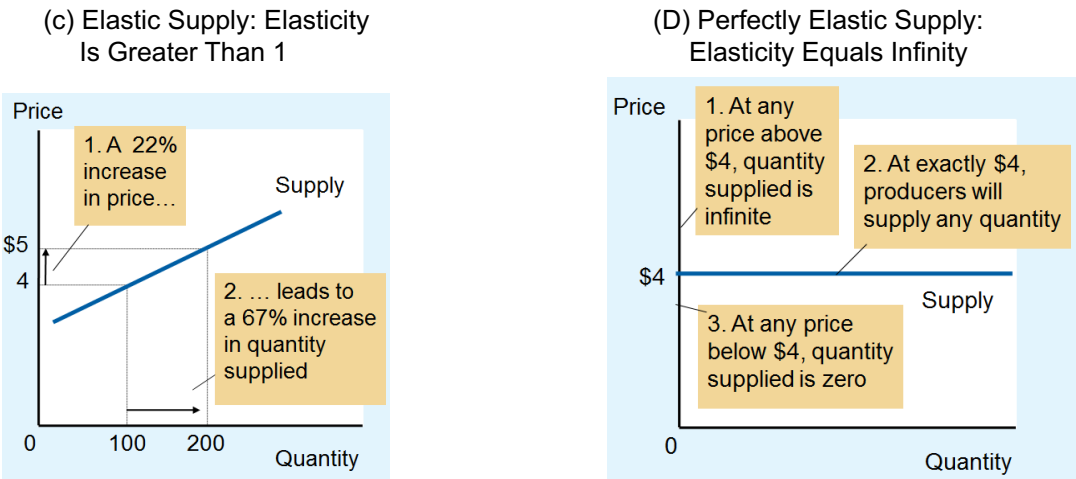0   100 110
                          Quantity

- The price elasticity of supply determines whether the supply curve is steep or flat.
- Note that all percentage changes are calculated using the midpoint method.

The Price Elasticity of Supply (c, d)

(c) Elastic Supply: Elasticity
Is Greater Than 1

Price

1. A 22% increase in price…

Supply

$5
4

2. … leads to a 67% increase in quantity supplied

0   100   200
            Quantity

(D) Perfectly Elastic Supply:
Elasticity Equals Infinity

Price

1. At any price above $4, quantity supplied is infinite

2. At exactly $4, producers will supply any quantity

$4

Supply

3. At any price below $4, quantity supplied is zero
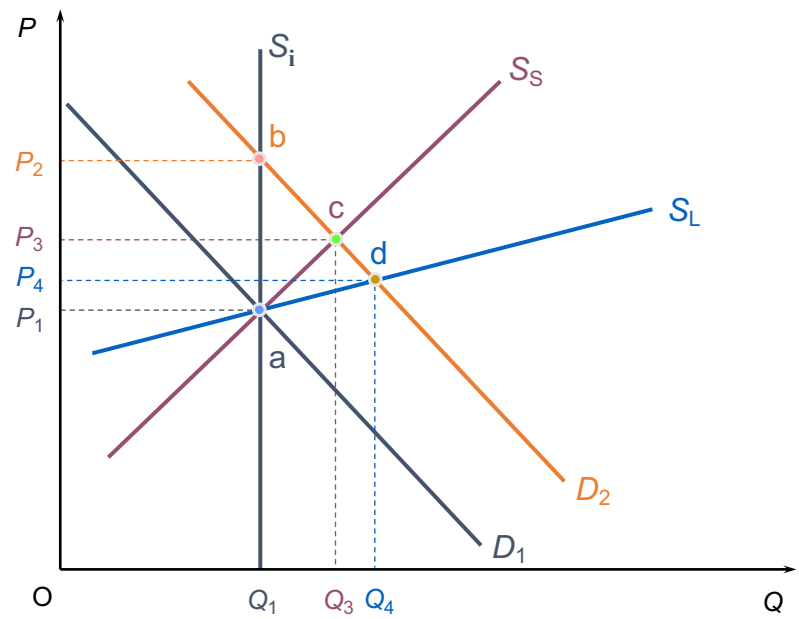
0
            Quantity

The price elasticity of supply determines whether the supply curve is steep or flat. Note that all percentage changes are calculated using the midpoint method.

Elasticity of Supply

P

S_i

S_S

b

P_2

c

S_L

P_3

d

P_4

P_1

a

D_2

D_1

O Q_1 Q_3 Q_4 Q

**13. Which of the following statements is valid when the market supply curve is vertical?**

a. Market quantity supplied does not change when the price changes.
b. Supply is perfectly elastic.
c. An increase in market demand will increase the equilibrium quantity.
d. An increase in market demand will not increase the equilibrium price.

14. Refer to Figure, Over which range is the supply curve in this figure the most elastic?
a. Between $16 and $40
b. Between $40 and $100
c. Between $100 and $220
d. Between $220 and $430

15. Refer to Figure, Using the midpoint method, what is the price elasticity of supply between $16 and $40?

a. 0.125
b. 0.86
c. 1.0
d. 2.5
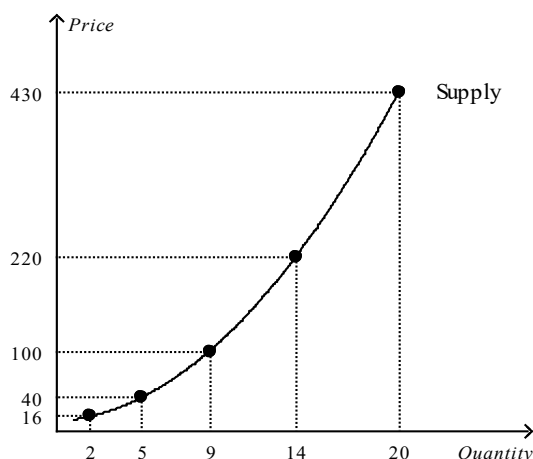
33

**16. The price elasticity of demand for a good will tend to increase as the:**
(a) number of available substitutes increases.
(b) consumer income level increases.
(c) good is a less important budget item.
(d) time allowed for response decreases.

17. Most college students strongly oppose tuition increases. If only one student in fifty transfers to another school following a ten percent tuition hike at your school, your economics professor would probably conclude that most students' demands for education at your college are:
(a) perfectly price elastic.
(b) relatively price elastic.
(c) unitarily price elastic.
(d) relatively price inelastic.

18. Scrutiny of demand curves DD and D_0D_0 reveals that:
(a) D_0D_0 is relatively more elastic at a price of P_1.
(b) DD is relatively more elastic at a price of P_2.
(c) D_0D_0 probably reflects the demand for a biological necessity.
(d) DD probably represents the demand for a good with more close substitutes.
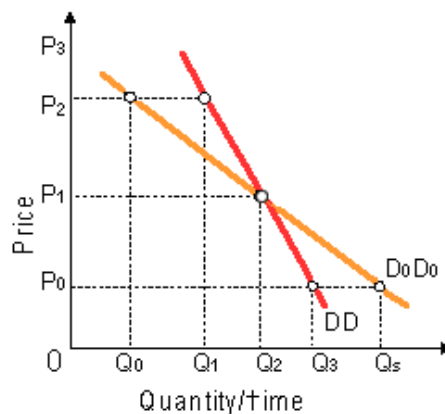
34

19. If average income rises from $18,000 per year to $22,000 per year and annual gasoline consumption per household rises from 1000 to 1500 gallons, the income elasticity of demand for gas is:
(a) in the inferior range.
(b) 0.5.
(c) 1.0.
(d) 2.0.

20 If a price hike from $15 to $20 for DVD disks causes sales of DVD players to fall from 100 to 50 units, the coefficient of cross-elasticity of demand between these goods is roughly:
(a) -1/10.
(b) -10.
(c) -7/3.
(d) -3/7.

21. At a price of $2 per can, the quantity of applesauce supplied daily is 1000 cases; at $4, the quantity supplied is 3000 cases daily. The price elasticity of supply is:
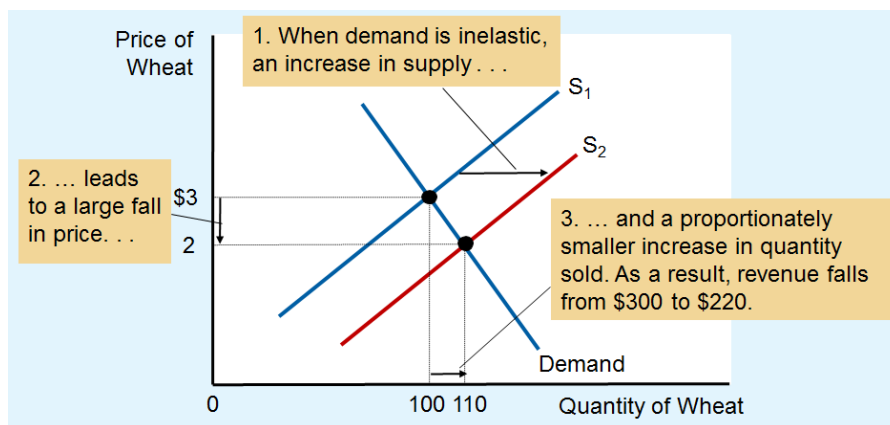(a) 2/3.
(b) 1/3.
(c) 3/2.
(d) 1/4.

22. The income elasticity of demand is a measure of the:
(a) relative responsiveness of quantity demanded to changes in income.
(b) absolute change in demand yielded by an absolute change in income.
(c) slope of the income-consumption curve.
(d) negative slope of a market demand curve.
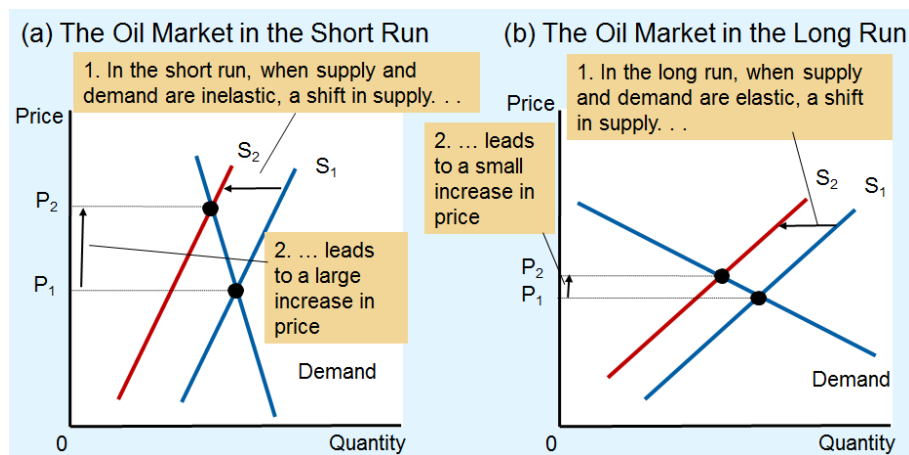
An Increase in Supply in the Market for Wheat

When an advance in farm technology increases the supply of wheat from S_1 to S_2, the price of wheat falls. Because the demand for wheat is inelastic, the increase in the quantity sold from 100 to 110 is proportionately smaller than the decrease in the price from $3 to $2. As a result, farmers' total revenue falls from $300 ($3 × 100) to $220 ($2 × 110).

A Reduction in Supply in the World Market for Oil

(a) The Oil Market in the Short Run

1. In the short run, when supply and demand are inelastic, a shift in supply. . .

2. ... leads to a large increase in price

(b) The Oil Market in the Long Run

1. In the long run, when supply and demand are elastic, a shift in supply. . .

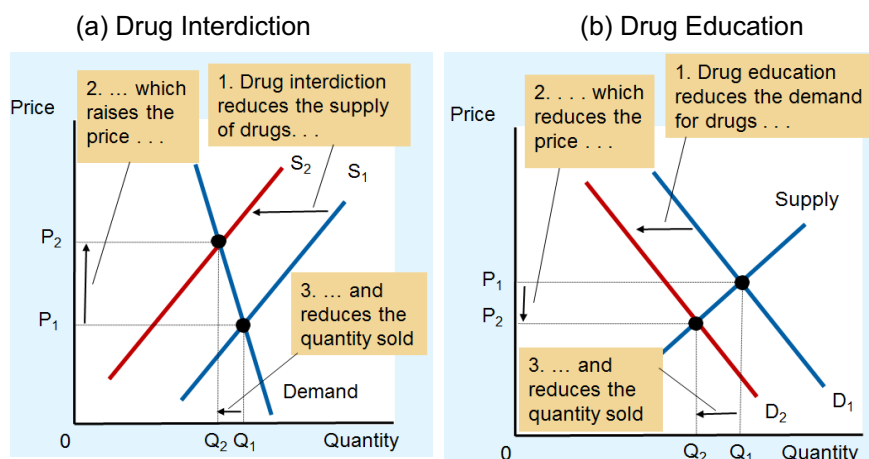2. ... leads to a small increase in price

- When the supply of oil falls, the response depends on the time horizon. In the short run, supply and demand are relatively inelastic, as in panel (a). Thus, when the supply curve shifts from S_1 to S_2, the price rises substantially.
- In the long run, however, supply and demand are relatively elastic, as in panel (b). In this case, the same size shift in the supply curve (S_1 to S_2) causes a smaller increase in the price.

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Policies to Reduce the Use of Illegal Drugs

(a) Drug Interdiction

1. Drug interdiction reduces the supply of drugs. . .

2. ... which raises the price . . .

3. ... and reduces the quantity sold

(b) Drug Education

1. Drug education reduces the demand for drugs . . .

2. . . . which reduces the price . . .

3. ... and reduces the quantity sold

- Drug interdiction reduces the supply of drugs from S_1 to S_2, as in panel (a). If the demand for drugs is inelastic, then the total amount paid by drug users rises, even as the amount of drug use falls.
- By contrast, drug education reduces the demand for drugs from D_1 to D_2, as in panel (b). Because both price and quantity fall, the amount paid by drug users falls.

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