EC1101E:
Introduction to Economic Analysis

Lecture 3	**How Markets Work** ▪ Elasticity **Welfare Economics** ▪ The Efficiency of Markets

Elasticity

- **Elasticity** is a measure of
  the *responsiveness* of Q^D or Q^S
  to one of its determinants
  (price, price of a related good, income).

  - **Price elasticity of demand**
  - **Cross-price elasticity of demand**
  - **Income elasticity of demand**
  - **Price elasticity of supply**

Elasticity:
Price Elasticity of Demand

Price Elasticity of Demand

$$\text{Price elasticity of demand} = \frac{\text{Percentage change in } Q^D}{\text{Percentage change in } P}$$

- **Price elasticity of demand** measures how much Q^D responds to a change in P.
- Loosely speaking, it measures the *price-sensitivity* of buyers' demand.

Price Elasticity of Demand

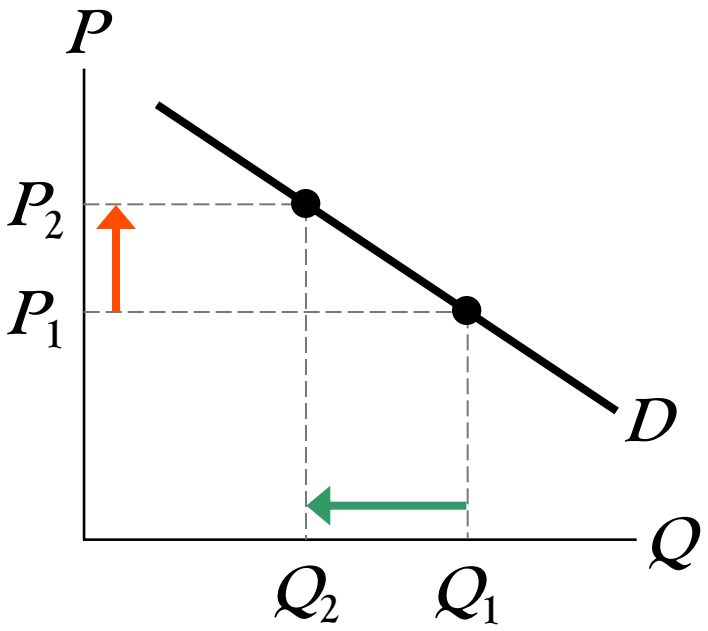
$$\text{Price elasticity of demand} = \frac{\text{Percentage change in } Q^D}{\text{Percentage change in } P}$$

Example:

Price elasticity of demand equals

$$\frac{15\%}{10\%} = 1.5$$

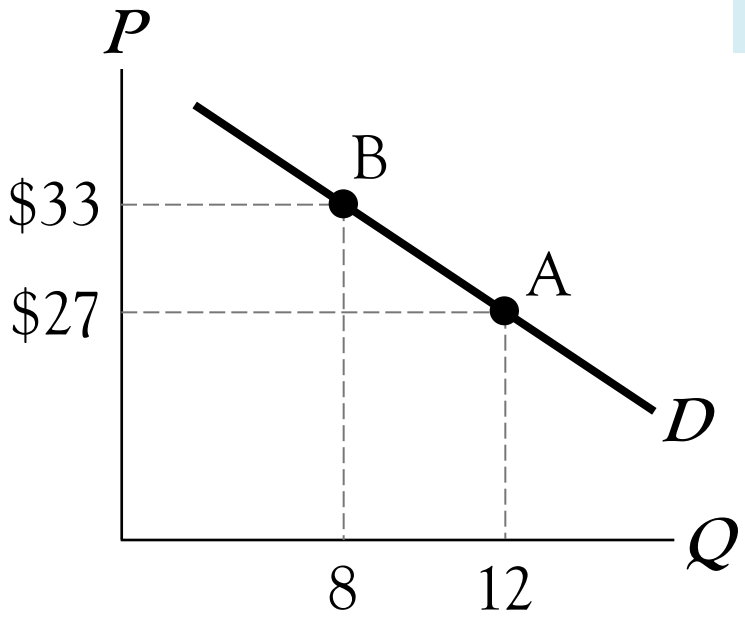
P rises by 10%



Q falls by 15%

Calculating Percentage Changes

Demand for your tutoring



Standard method of computing percentage change:

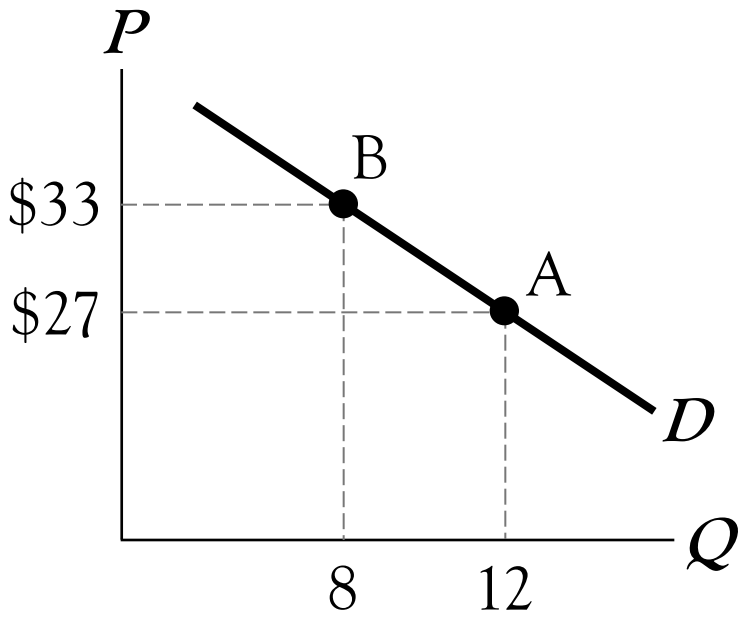
$$\frac{\text{end value} - \text{start value}}{\text{start value}} \times 100\%$$

Going from A to B,
the % change in ***P*** equals

($33 – $27) / $27 = 22.22%

Calculating Percentage Changes

Demand for your tutoring



Problem:
The standard method gives different answers depending on where you start.

From A to B,

P rises 22.22%, ***Q*** falls 33%,

elasticity = 33/22.22 = 1.485

From B to A,

P falls 18.18%, ***Q*** rises 50%,

elasticity = 50/18.18 = 2.750

Calculating Percentage Changes

- Instead, we use the **midpoint method:**

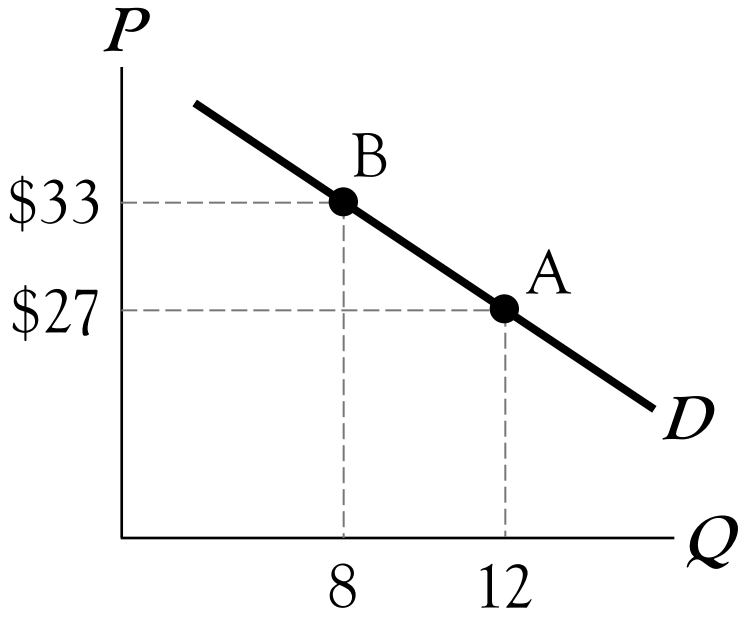
$$\frac{\text{end value} - \text{start value}}{\text{midpoint}} \times 100\%$$

- The **midpoint** is the number halfway between the start and end values; it is the average of those values.

- It doesn't matter which value you use as the "start" and which as the "end"
  — you get the same answer either way!

Calculating Percentage Changes

Demand for your tutoring



Percentage change in P:

$$\frac{\$33 - \$27}{\$30} \times 100\% = 20\%$$

Percentage change in Q:

$$\frac{8 - 12}{10} \times 100\% = 40\%$$

Price elasticity of demand:

$$\frac{40\%}{20\%} = 2$$

The Variety of Demand Curves

- The price elasticity of demand is closely related to the slope of the demand curve.
- Rule of thumb:

  The flatter the curve, the greater the elasticity.

  The steeper the curve, the smaller the elasticity.

- Five different classifications of D curves ...

"Perfectly inelastic demand" (one extreme)

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

D curve:

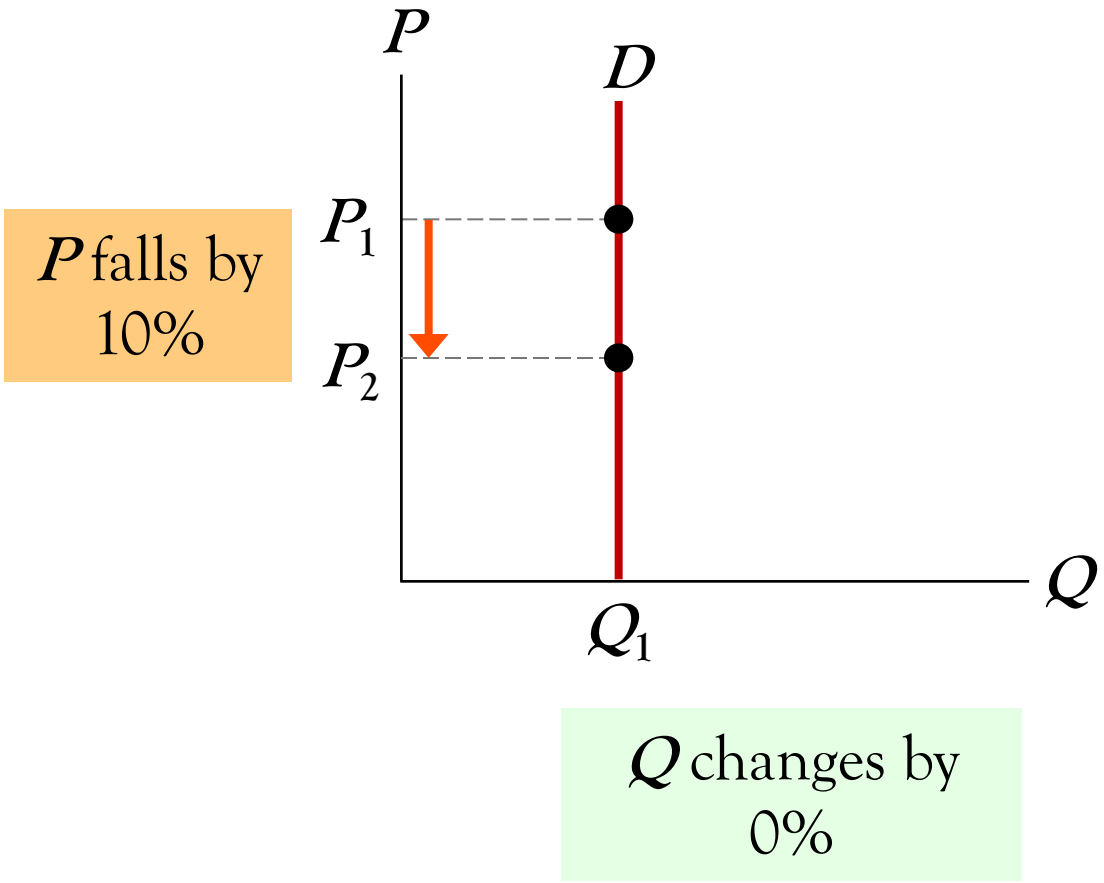
vertical

Consumers' price sensitivity:

none

Elasticity:

0



"Inelastic demand"

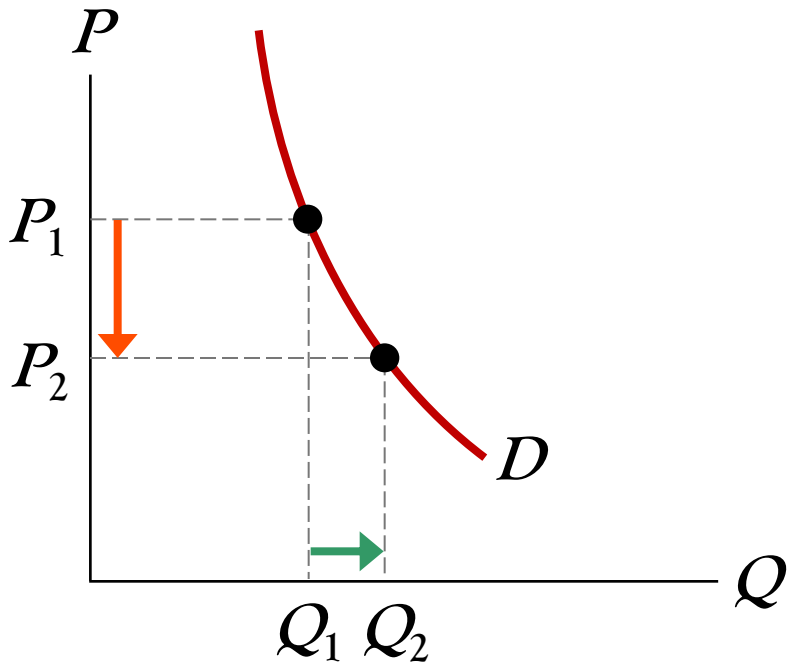
$$\text{Price elasticity of demand} = \frac{\%\text{ change in } Q}{\%\text{ change in } P} = \frac{< 10\%}{10\%} = < 1$$

D curve:
relatively steep

Consumers' price sensitivity:
relatively low

Elasticity:
< 1

P falls by 10%



Q rises by less than 10%

"Unit elastic demand"

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

D curve:

intermediate slope

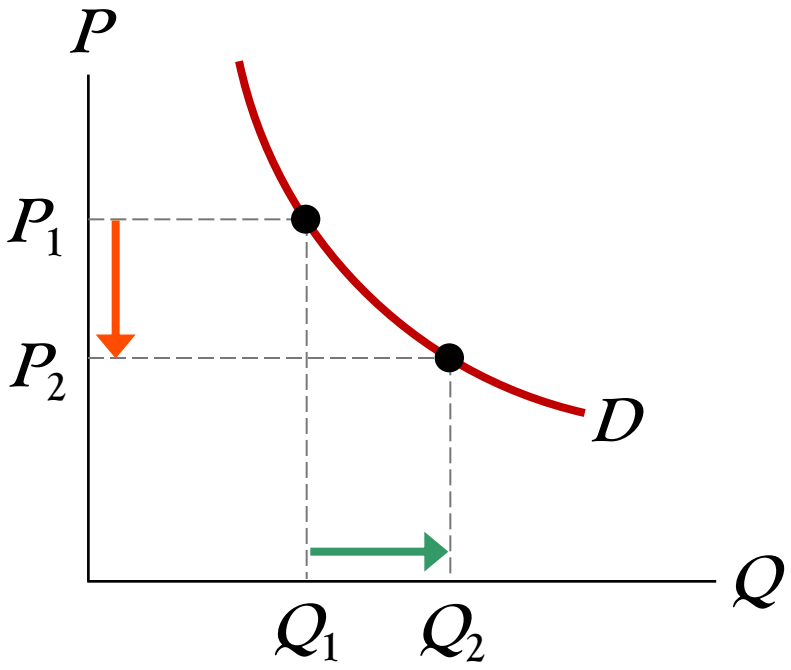
Consumers' price sensitivity:

intermediate

Elasticity:

1

P falls by 10%



Q rises by 10%

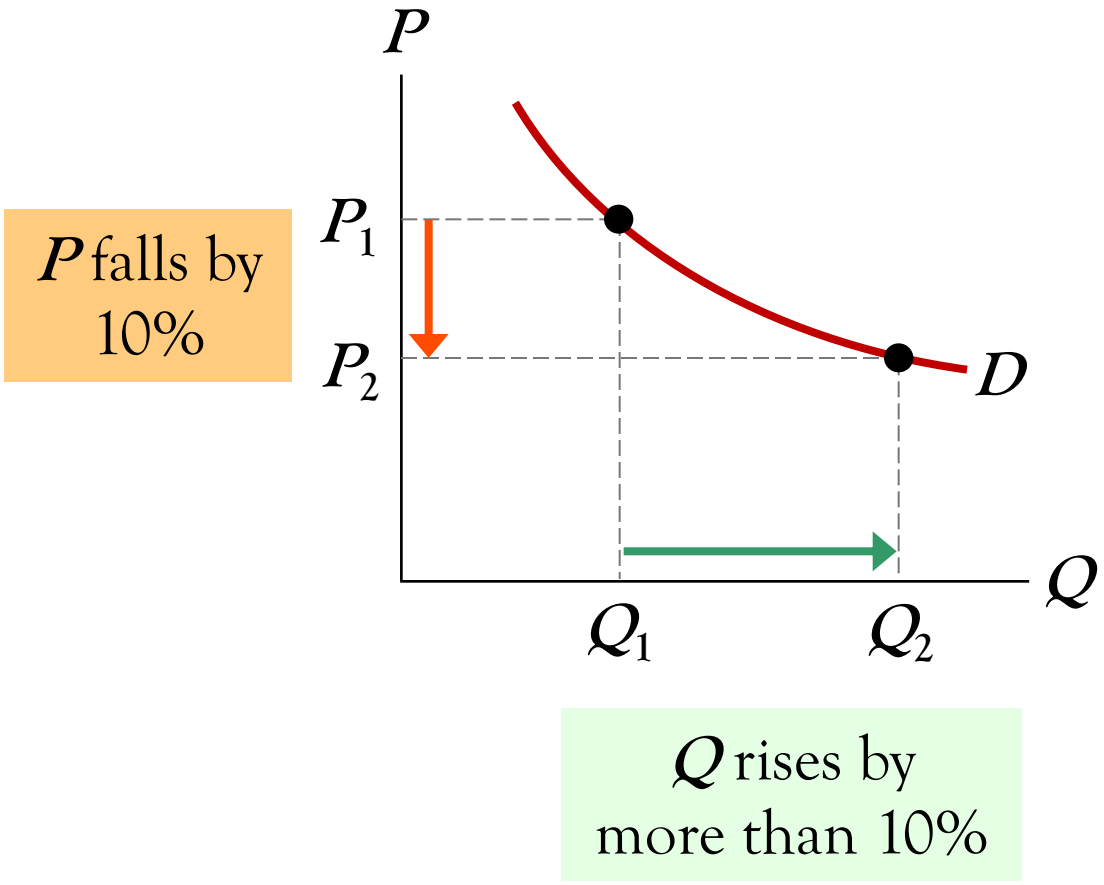
"Elastic demand"

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

D curve:
relatively flat

Consumers' price sensitivity:
relatively high

Elasticity:
> 1



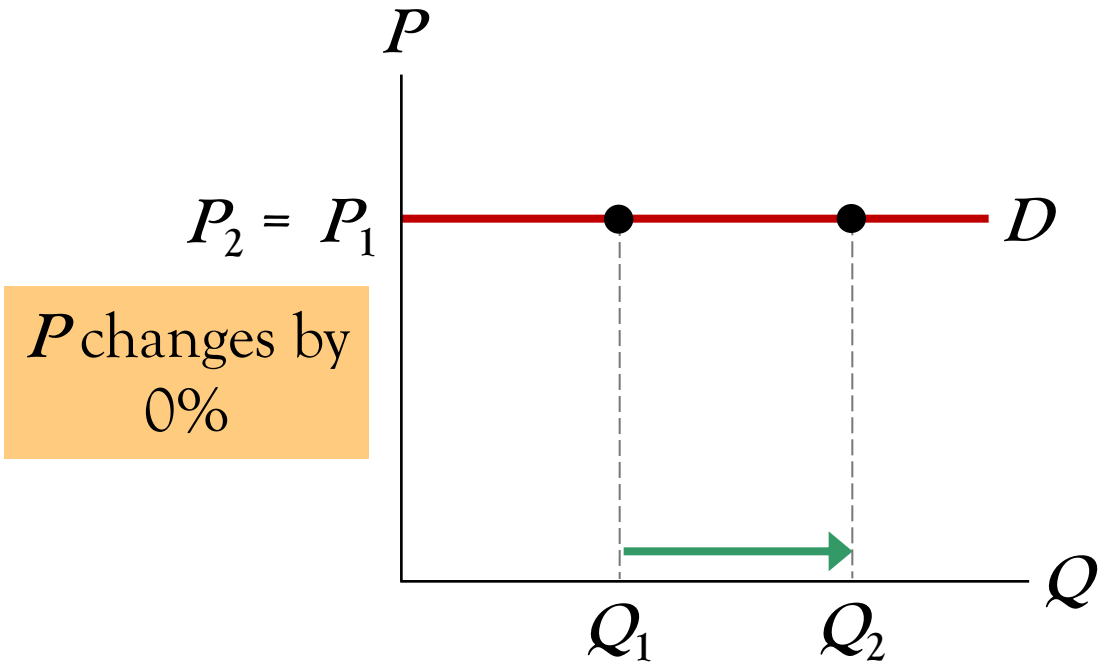
"Perfectly elastic demand" (the other extreme)

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

D curve:
horizontal

Consumers' price sensitivity:
extreme

Elasticity:
infinity



P changes by 0%

Q changes by any %

Determinants of the Price Elasticity of Demand

- We will look at a series of examples.
- Each example compares two common goods.
- In each example:
  - Suppose the prices of both goods rise by 20%.
  - The good with a bigger fall in Q^D (in percent) has the greater price elasticity of demand.
    Which good is it? Why?
  - What does the example tell us about
    the determinants of the price elasticity of demand?

EXAMPLE 1:
Blue Jeans vs. Clothing

- The prices of both goods rise by 20%.
  Which good has a bigger fall in Q^D? Why?
  - For a narrowly defined good, *e.g.*, blue jeans, there are many substitutes.
  - For a broadly defined good, *e.g.*, clothing, there are fewer substitutes.

The price elasticity of demand is greater
for **narrowly defined goods**
than for **broadly defined ones.**

EXAMPLE 2:
Potable Water vs. Caribbean Cruises

- The prices of both goods rise by 20%.
  Which good has a bigger fall in Q^D? Why?
  - Potable water is a **necessity.**
  - A cruise is a **luxury.**

The price elasticity of demand is greater
for **luxuries**
than for **necessities.**

EXAMPLE 3:
Breakfast Cereal vs. Rabies Vaccine

- The prices of both goods rise by 20%. Which good has a bigger fall in Q^D? Why?
  - Breakfast cereal has **close substitutes.**
  - Rabies vaccine has **no close substitutes.**

The price elasticity of demand is greater when **close substitutes are available.**

EXAMPLE 4:
Nonbranded Flip-flops vs. Nike Sneakers

- The prices of both goods rise by 20%.
  Which good has a bigger fall in Q^D? Why?
  - A pair of nonbranded flip-flops can cost less than $10.
  - A pair of Nike sneakers can cost anywhere from $80 to over $200.

The price elasticity of demand is greater
for **expensive goods**
than for **cheap ones.**

EXAMPLE 5:
Petrol in the Short Run vs. Petrol in the Long Run

- The price of petrol rises by 20%.
  Does Q^D fall more in the short run or in the long run? Why?
  - In the short run, there's **not much** we can do other than take public transport or carpool.
  - In the long run, we can buy fuel-efficient cars or live closer to our workplace.

The price elasticity of demand is greater

in the long run

than **in the short run.**

Determinants of the Price Elasticity of Demand

The price elasticity of demand depends on:

- how *broadly* or *narrowly* the good is defined
- whether the good is a *necessity* or a *luxury*
- the extent to which *close substitutes* are available
- how *expensive* the good is
- the time horizon — elasticity is higher in the *long* run than in the *short* run

To Raise or Not to Raise?

You tutor elementary school students.
You charge $27 per hour,
and currently tutor 12 hours a week.

Your costs are rising
(including the opportunity cost of your time),
so you consider raising your rate to $33 per hour.

The law of demand says that if you raise your rate,
the quantity demanded will fall.

Will your revenue rise or fall?

Price Elasticity and Revenue

- If you raise your hourly rate from $27 to $33, will your revenue rise or fall?

$$\text{Revenue} = P \times Q$$

- A price increase has two effects on revenue:
  - $P \uparrow$ => Revenue $\uparrow$
  - $Q \downarrow$ => Revenue $\downarrow$
- Which effect dominates?
  It depends on the **price elasticity of demand.**

Price Elasticity and Revenue

$$\text{Price elasticity of demand} = \frac{\text{Percentage change in } Q^D}{\text{Percentage change in } P}$$

Revenue = P x Q

- If demand is **elastic,**

  then price elasticity of demand > 1.

  % change in Q > % change in P

- The fall in revenue from a lower Q dominates the rise in revenue from a higher P,

  so revenue ↓.

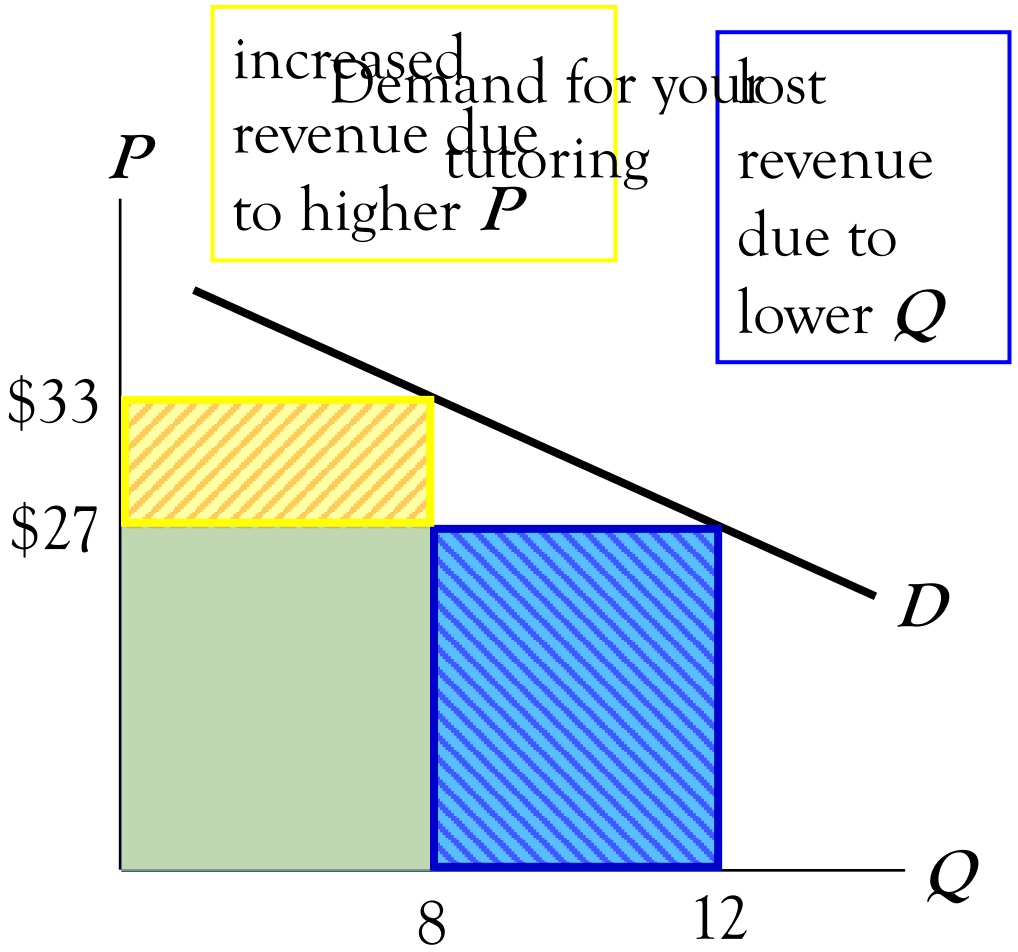
Price Elasticity and Revenue

Elastic demand
(elasticity = 2)

If P = \$27,
Q = 12, and
revenue = \$324.

If P = \$33,
Q = 8, and
revenue = \$264.

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



Price Elasticity and Revenue

$$\text{Price elasticity of demand} = \frac{\text{Percentage change in } Q^D}{\text{Percentage change in } P}$$

Revenue = P x Q

- If demand is **inelastic**,

  then price elasticity of demand < 1.

  % change in Q < % change in P

- The rise in revenue from a higher P dominates the fall in revenue from a lower Q,

  so revenue ↑.

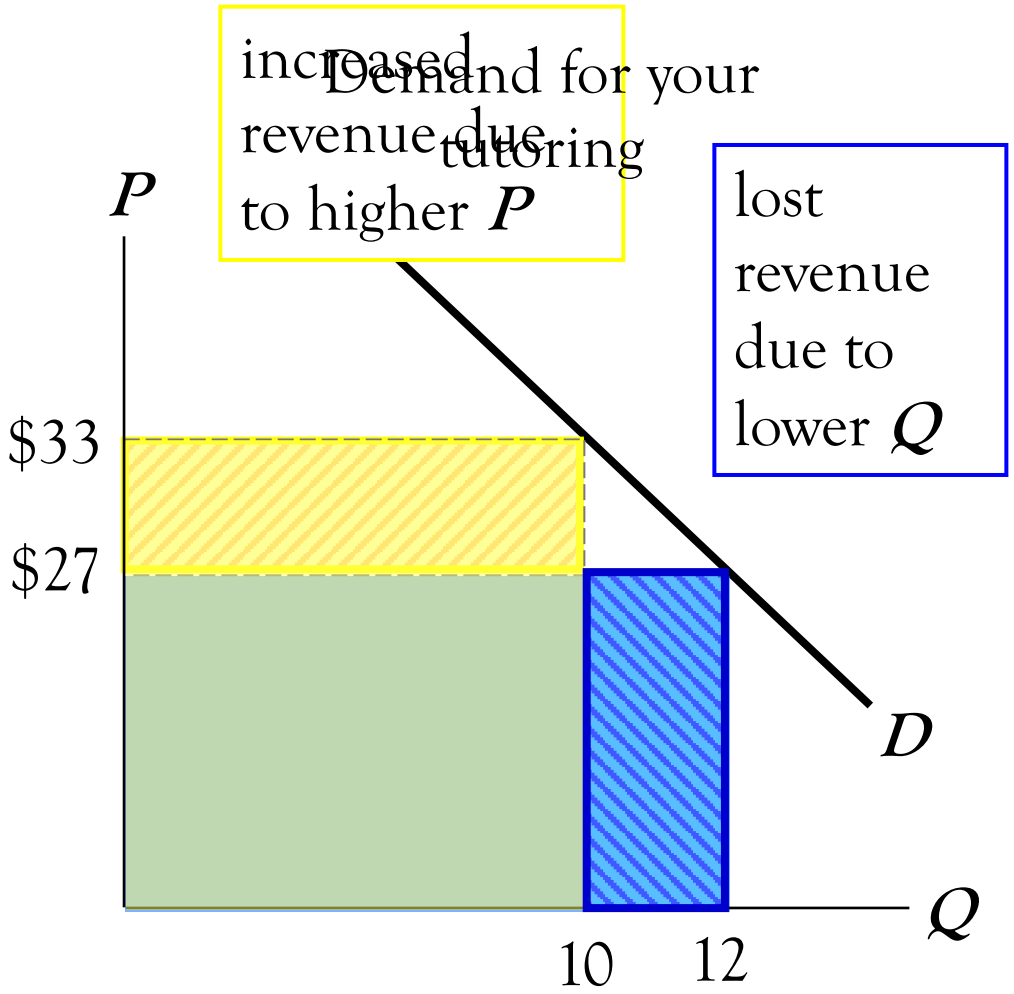
Price Elasticity and Revenue

Inelastic demand
(elasticity = 0.91)

If P = \$27,
Q = 12, and
revenue = \$324.

If P = \$33,
Q = 10, and
revenue = \$330.

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



ACTIVE LEARNING *3.1*
Price Elasticity and Revenue

In each of the following scenarios, does revenue rise or fall? Why?

A. Pharmacies raise the price of insulin by 10 percent.

B. As a result of a fare war, the price of luxury cruises falls by 20 percent.

ACTIVE LEARNING *3.2*

Luxury Brands

Why did luxury brands like Chanel, Louis Vuitton, and Gucci raise their prices in the first half of 2020?

Elasticity:
Cross-Price Elasticity of Demand

Cross-price Elasticity of Demand

- **Cross-price elasticity of demand** measures how much Q^D responds to a change in the price of another good.

$$\text{Cross-price elasticity of demand} = \frac{\%\ \Delta \text{ in } Q^D \text{ of good 1}}{\%\ \Delta \text{ in } P \text{ of good 2}}$$

- For **substitutes,** cross-price elasticity > 0.
- For **complements,** cross-price elasticity < 0.

Elasticity:
Income Elasticity of Demand

Income Elasticity of Demand

- **Income elasticity of demand** measures how much Q^D responds to a change in income.

$$\text{Income elasticity of demand} = \frac{\%\ \Delta \text{ in } Q^D}{\%\ \Delta \text{ in income}}$$

- For **normal goods,** income elasticity > 0.
- For **inferior goods,** income elasticity < 0.

ACTIVE LEARNING *3.3*
Demand Elasticities

Each of the following statements tells us something about widgets: the demand for them is either *elastic* or *inelastic*; they are either *normal* or *inferior*; they are either *substitutes* for or *complements* to another good.

A. The income elasticity of demand for widgets is –0.5.

B. The price elasticity of demand for widgets is 1.5.

C. The cross-price elasticity of demand for widgets with gadgets is 0.8.

Elasticity:
Price Elasticity of Supply

Price Elasticity of Supply

$$\text{Price elasticity of supply} = \frac{\text{Percentage change in } Q^S}{\text{Percentage change in } P}$$

- **Price elasticity of supply** measures how much Q^S responds to a change in P.
- Loosely speaking, it measures the *price-sensitivity* of sellers' supply.
- Again, use the midpoint method to compute percentage changes.

Price Elasticity of Supply

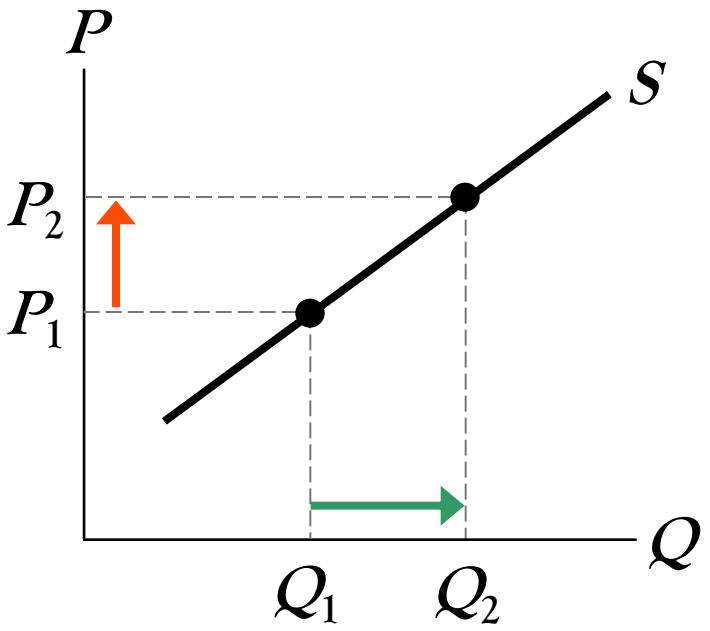
$$\text{Price elasticity of supply} = \frac{\text{Percentage change in } Q^S}{\text{Percentage change in } P}$$

Example:

Price elasticity of supply equals

$$\frac{16\%}{8\%} = 2.0$$

P rises by 8%



Q rises by 16%

The Variety of Supply Curves

- The price elasticity of supply is closely related to the slope of the supply curve.
- Rule of thumb:

  The flatter the curve, the greater the elasticity.

  The steeper the curve, the smaller the elasticity.

- Five different classifications of ***S*** curves ...

"Perfectly inelastic supply" (one extreme)

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

S curve:

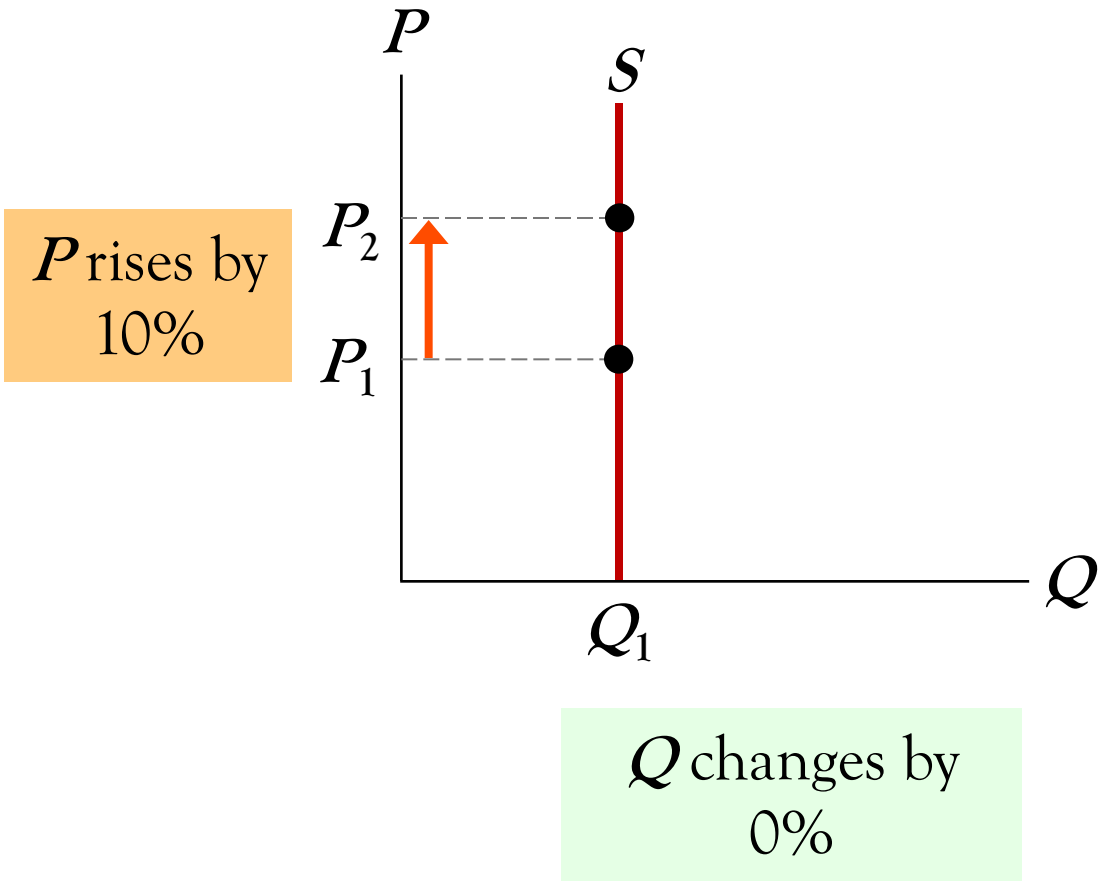
vertical

Sellers' price sensitivity:

none

Elasticity:

0



"Inelastic supply"

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

S curve:

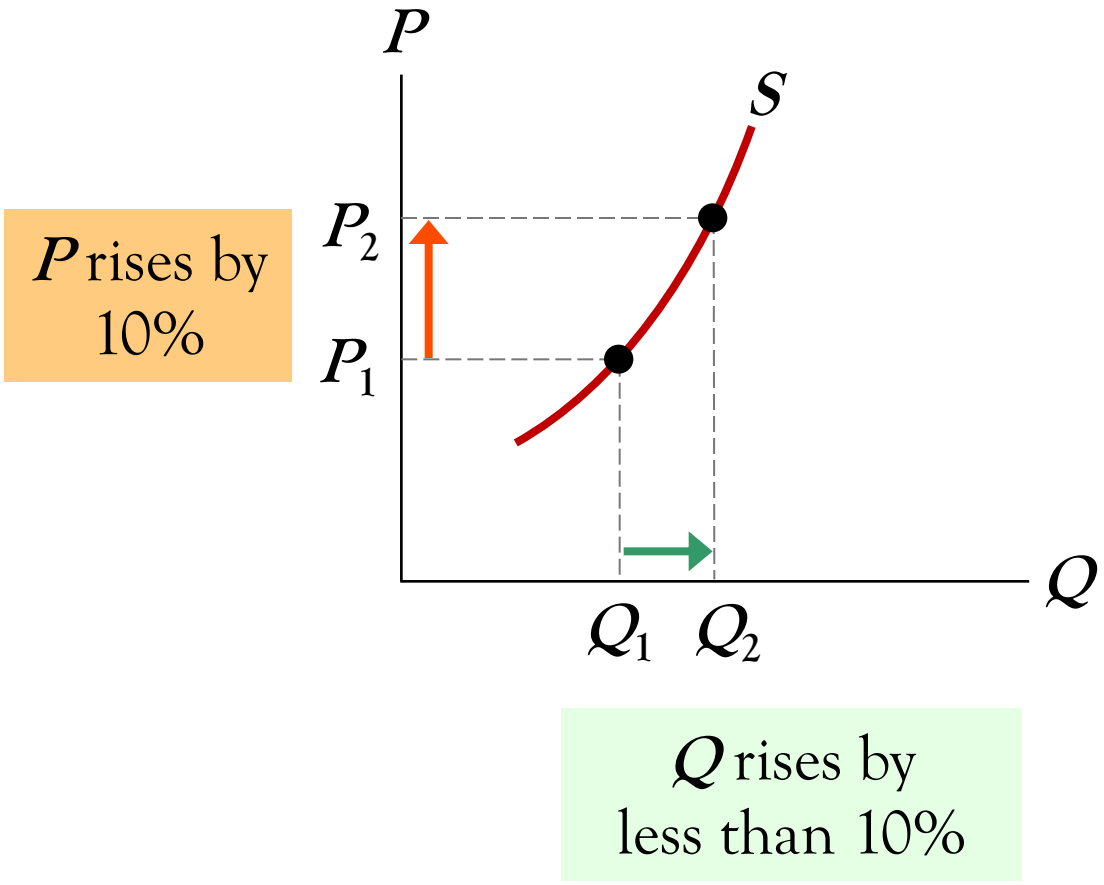
relatively steep

Sellers' price sensitivity:

relatively low

Elasticity:

< 1



"Unit elastic supply"

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

S curve:

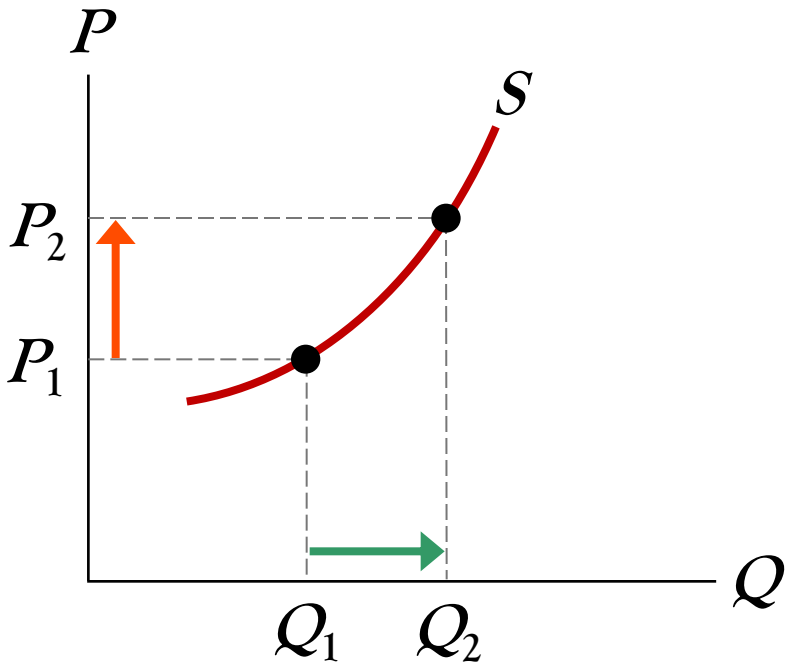
intermediate slope

Sellers' price sensitivity:

intermediate

Elasticity:

= 1



P rises by 10%

Q rises by 10%

"Elastic supply"

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

S curve:

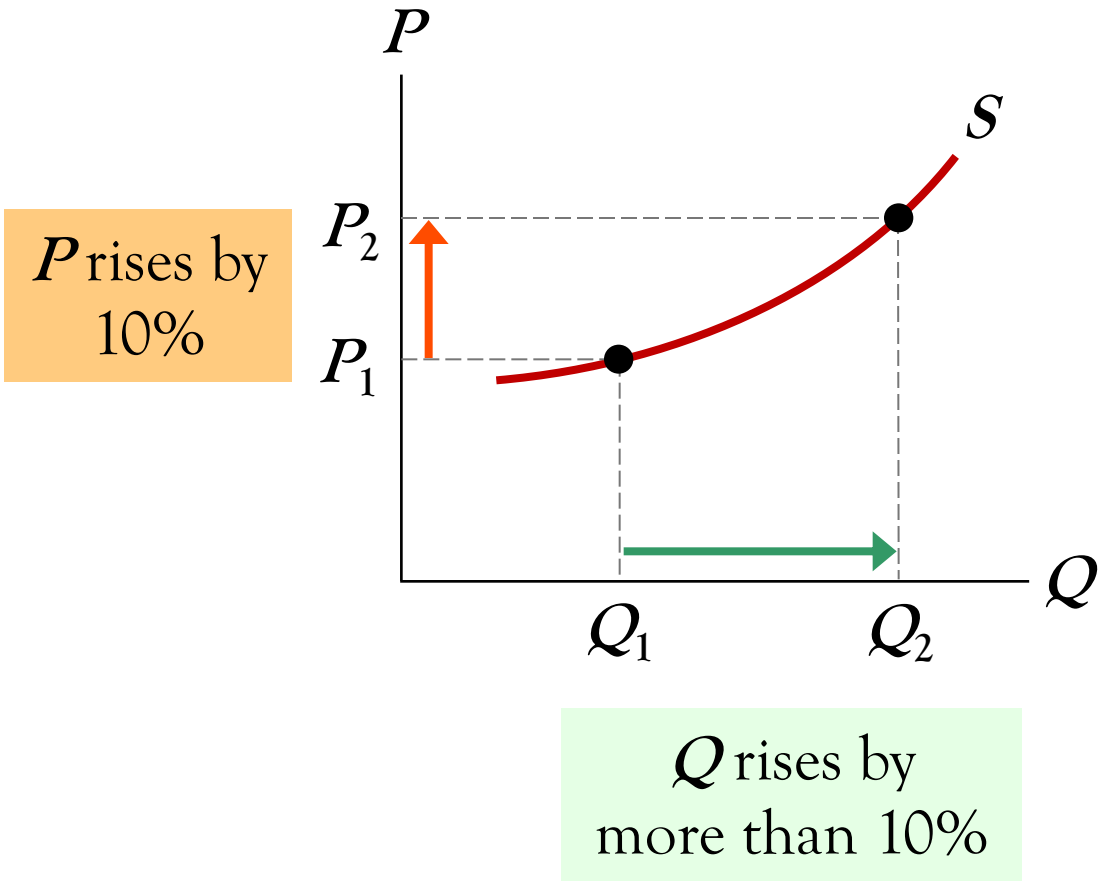
relatively flat

Sellers' price sensitivity:

relatively high

Elasticity:

> 1



"Perfectly elastic supply" (the other extreme)

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

S curve:

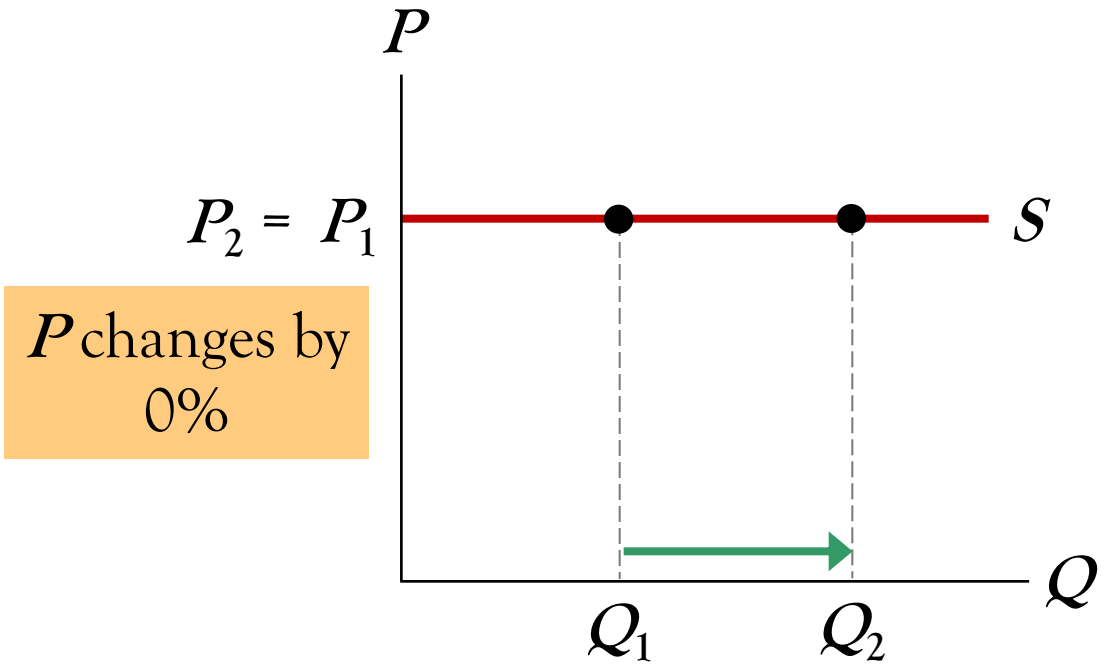
horizontal

Sellers' price sensitivity:

extreme

Elasticity:

infinity



P changes by 0%

Q changes by any %

Determinants of the Price Elasticity of Supply

- The more easily sellers can change the quantity they produce,
  the *greater* the price elasticity of supply, *e.g.*,
  - The supply of submarines is harder to vary and thus less elastic than the supply of sampan.

Determinants of the Price Elasticity of Supply

- For many goods, the price elasticity of supply is greater in the *long* run than in the *short* run
  because firms can build new factories,
  or new firms may be able to enter the market.

ACTIVE LEARNING *3.4*
Elasticity and Changes in Equilibrium

Consider the markets for the following goods. Suppose population growth over the next few years causes demand for the good to double. Which is bigger — the change in ***P*** or the change in ***Q***?

A. Beachfront property.

B. Flat-screen TVs.

Hint: Is the supply of beachfront property elastic?
Is the supply of flat-screen TVs elastic?

ACTIVE LEARNING *3.4*

A. Beachfront property

ACTIVE LEARNING *3.4*

B. Flat-screen TVs

ACTIVE LEARNING *3.5*
Elasticity

When the price of rice is $2 per kg, farmers can sell 10 million kg. When the price of rice is $3 per kg, farmers can sell 8 million kg. Which of the following statements is true?

A. The demand for rice is income inelastic; an increase in the price of rice will increase farmers' total revenue.

B. The demand for rice is income elastic; an increase in the price of rice will decrease farmers' total revenue.

C. The demand for rice is price inelastic; an increase in the price of rice will increase farmers' total revenue.

D. The demand for rice is price elastic; an increase in the price of rice will decrease farmers' total revenue.

E. The demand for rice is price inelastic; an increase in the price of rice will decrease farmers' total revenue.

ACTIVE LEARNING *3.5*
Elasticity

When the price of rice is $2 per kg, farmers can sell 10 million kg. When the price of rice is $3 per kg, farmers can sell 8 million kg. Which of the following statements is true?

Test Yourself

- The price elasticity of demand measures how much the _____ responds to changes in the _____.
- Suppose the price elasticity of demand of gadgets is 0.5. A price increase causes revenue to _____.
- Suppose the price elasticity of demand of widgets is 2. A price decrease causes revenue to _____.

Test Yourself

- The price elasticity of supply measures how much the _____ responds to changes in the _____.
- Suppose the price elasticity of supply of bidgets is 0.3. A decrease in demand has a bigger impact on _____ than on _____.
- Suppose the price elasticity of supply of badgets is 1.5. An increase in demand has a bigger impact on _____ than on _____.

Test Yourself

- The income elasticity of demand measures how much the _____ responds to changes in _____.
- The income elasticity of demand is _____ for cab rides, and _____ for bus rides.

Test Yourself

- The cross-price elasticity of demand measures how much the _____ of one good responds to changes in the _____ of another good.
- The cross-price elasticity of demand is _____ for butter and margarine, and _____ for milk and cookies.

The Efficiency of Markets

Welfare Economics

- We have seen how the price of a good or service adjusts to balance supply and demand in a market economy.
- Is the equilibrium quantity:

too large

too small

just right

Welfare Economics

- **Welfare economics** studies
  how the allocation of resources affects *economic well-being.*

- The **allocation of resources** refers to:
  - *how much* of each good and service is produced
  - *which producers* produce them
  - *which consumers* consume them

The Efficiency of Markets:
WTP and Consumer Surplus

Willingness to Pay (WTP)

- A buyer's **willingness to pay** for a good
  is the *maximum* amount
  the buyer will pay for that good.

- WTP measures how much the buyer *values* the good.

- A buyer will buy a good only if
  his **willingness to pay (WTP)**
  is at least as high as the price.

Willingness to Pay (WTP)

Example: Buyers' WTP for AirPods

Buyer	***WTP***
John	$300
Paul	$250
George	$175
Ringo	$125

Derive the demand schedule.

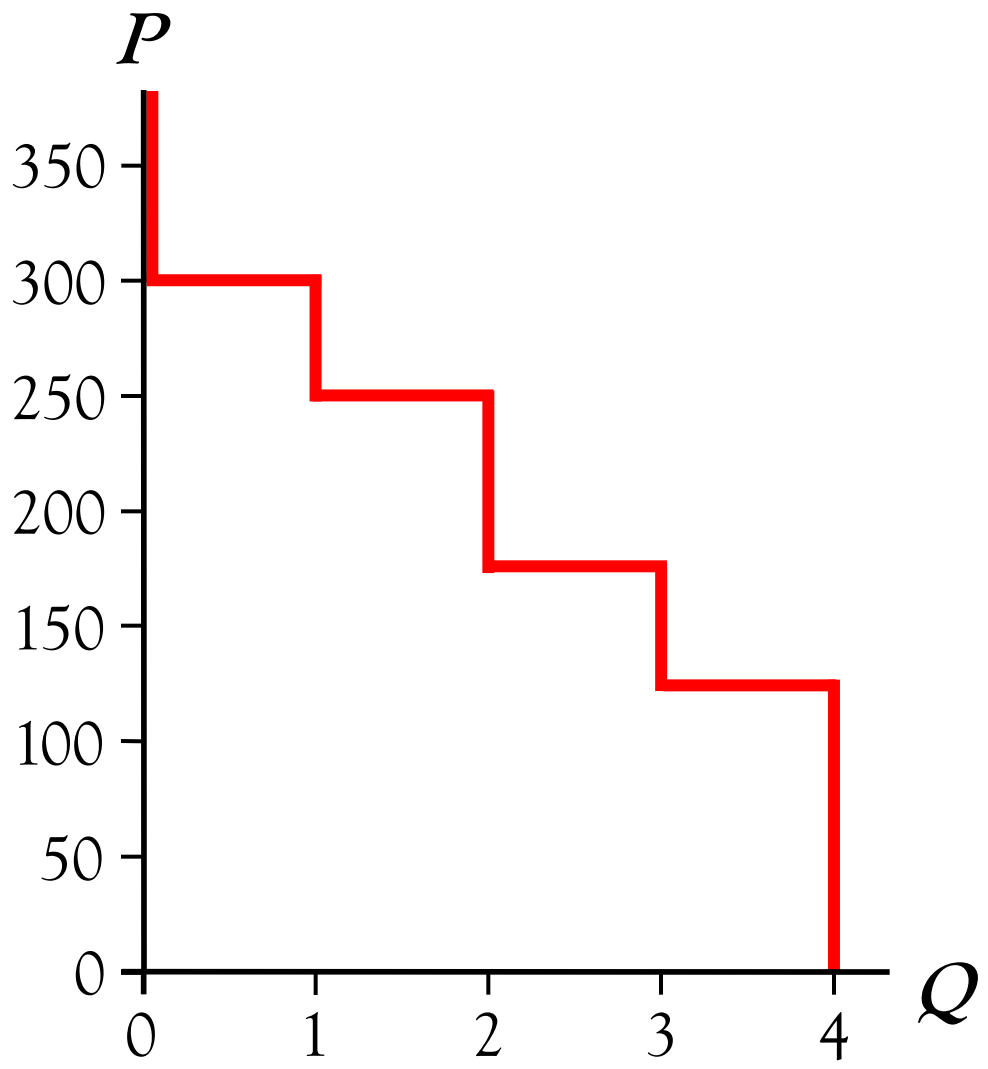
WTP and the Demand Schedule

Buyer	*WTP*
John	$300
Paul	$250
George	$175
Ringo	$125

P	Who Buys	Q^D
$301 & up	nobody	0
$251 – $300	John	1
$176 – $250	John, Paul	2
$126 – $175	John, Paul, George	3
$0 – $125	John, Paul, George, Ringo	4

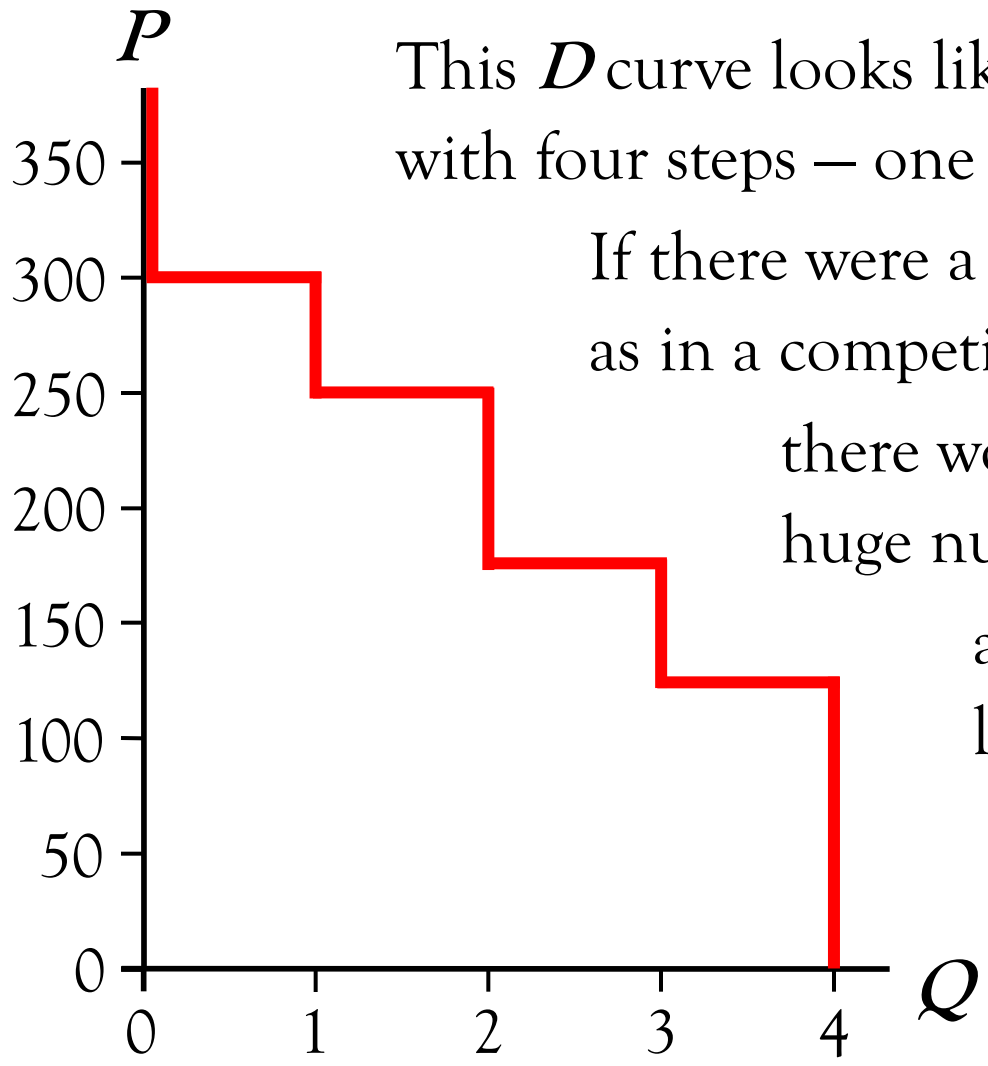
Compare Costs and Benefits

WTP and the Demand Curve



P	Q^D
\$301 & up	0
\$251 - \$300	1
\$176 - \$250	2
\$126 - \$175	3
\$0 - \$125	4

About the Staircase Shape ...



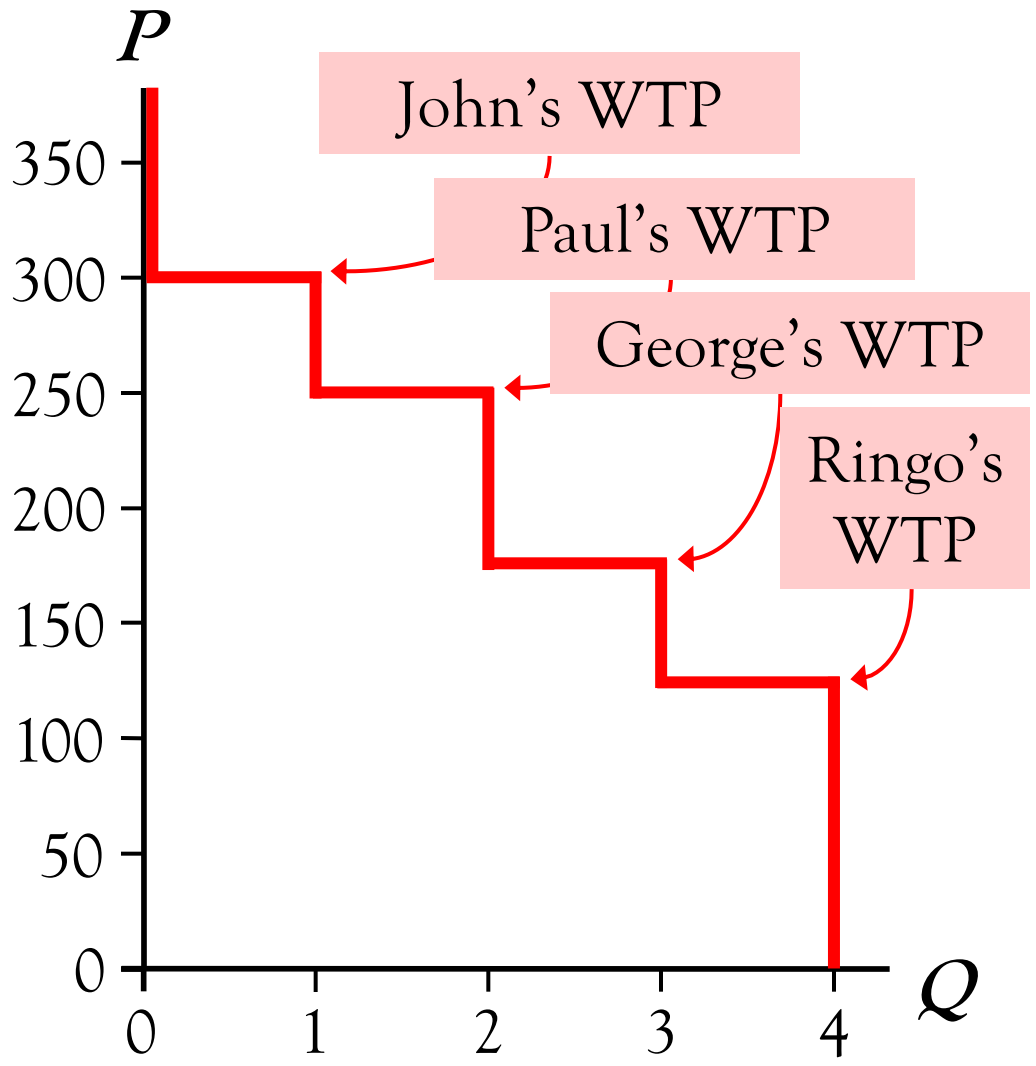
This *D* curve looks like a staircase with four steps — one per buyer.

If there were a huge number of buyers, as in a competitive market,

there would be a huge number of very tiny steps,

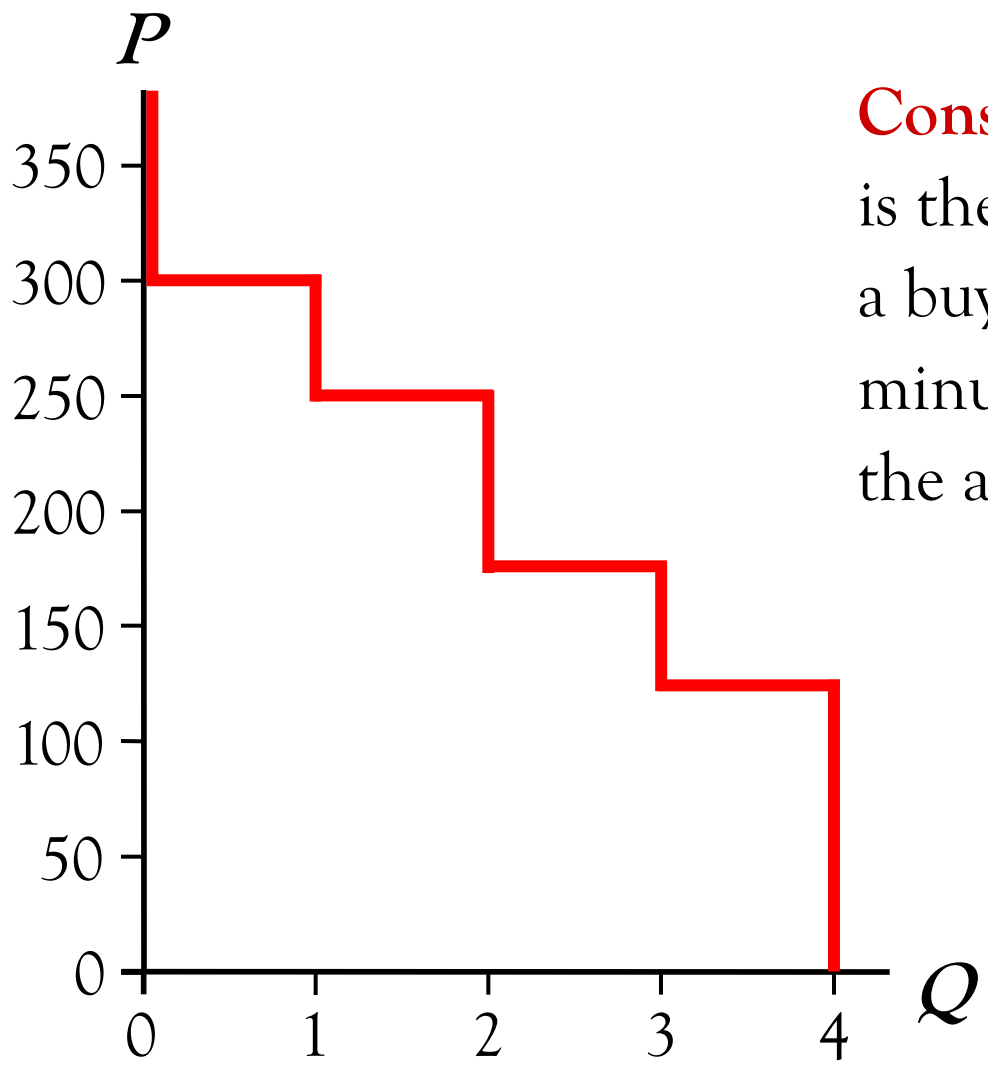
and it would look more like a smooth curve.

WTP and the Demand Curve



At each *Q*, the height of the *D* curve is the WTP of the *marginal buyer* – the buyer who would leave the market if *P* were any higher.

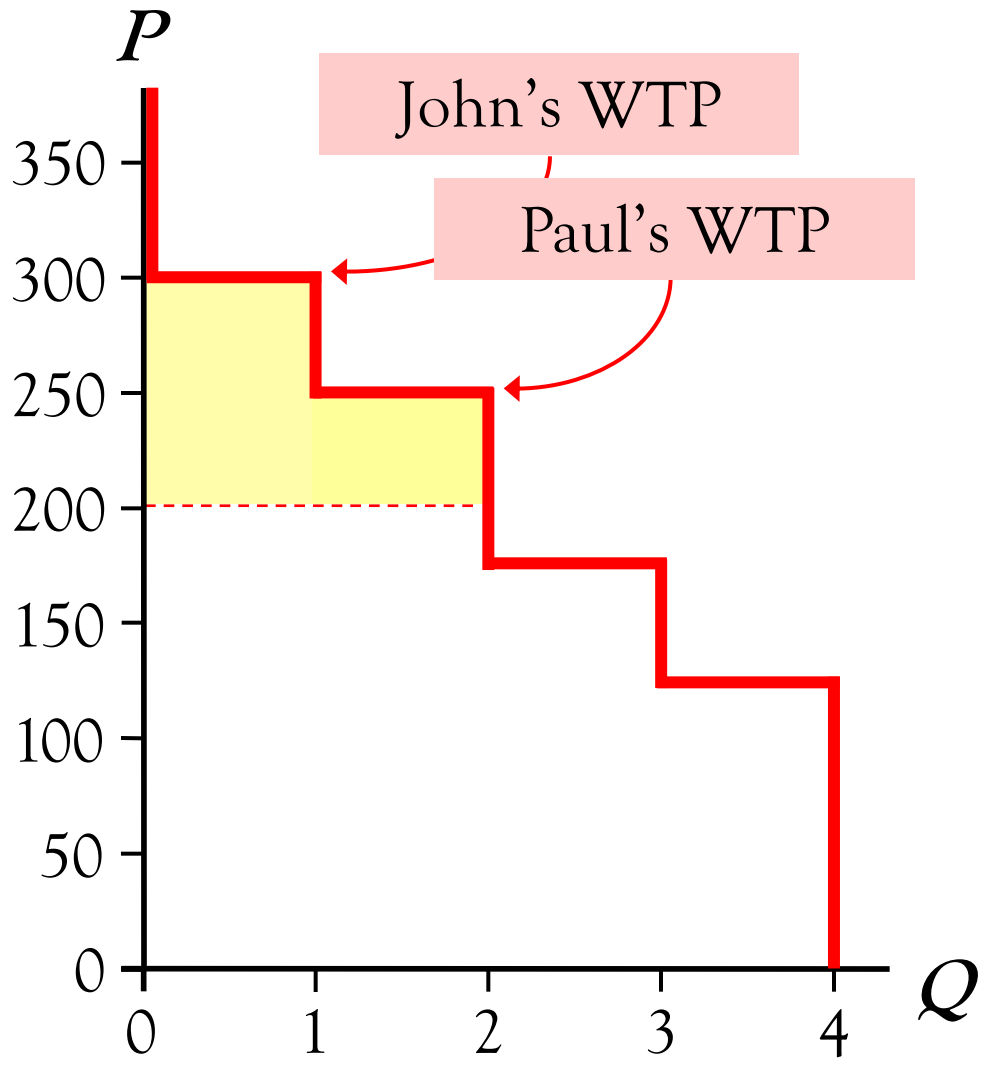
Consumer Surplus (CS)



Consumer surplus (CS)
is the amount
a buyer is willing to pay
minus
the amount he actually pays.

CS = WTP – *P*

Consumer Surplus and the Demand Curve



Suppose P = \$200.

John's CS
= \$300 – \$200
= \$100

Paul's CS
= \$250 – \$200
= \$50

Total CS = \$150

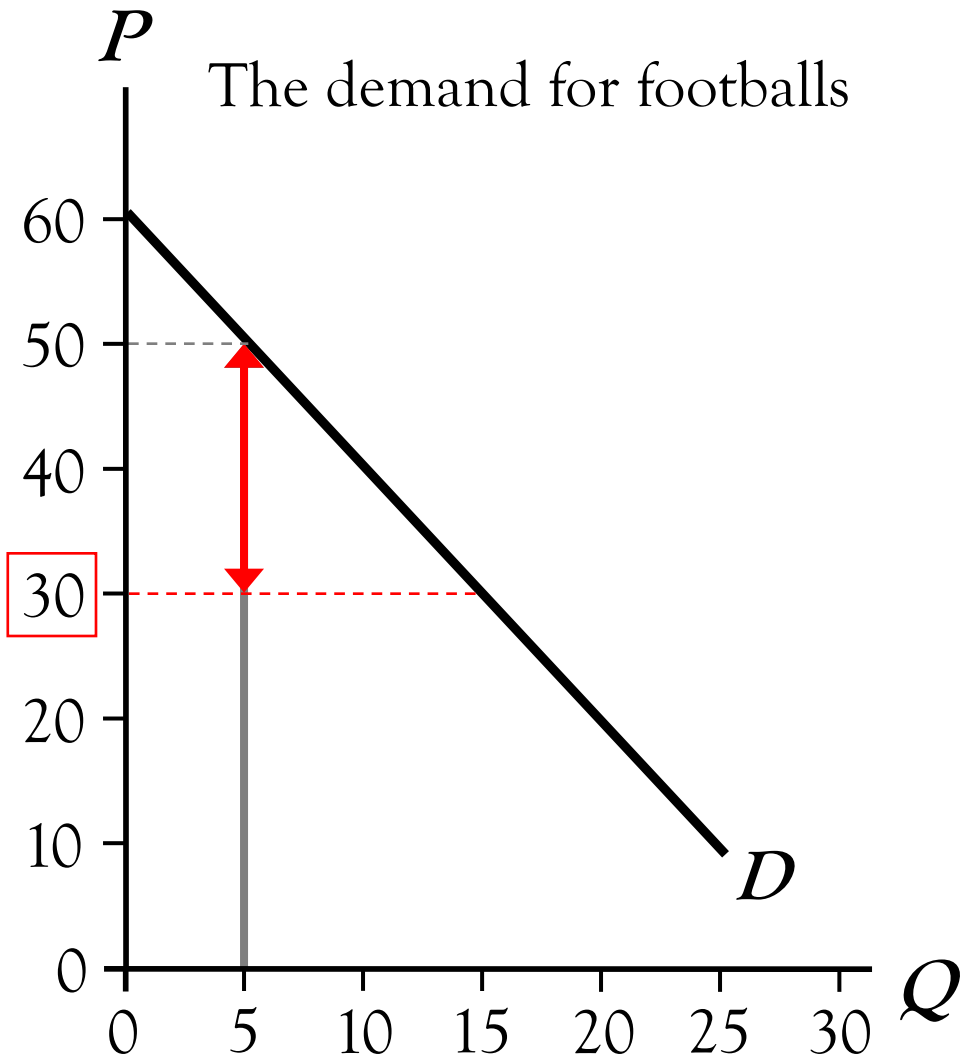
Total CS is the area below the D *curve, above the price, from 0 to* Q.

CS with Many Buyers and a Smooth *D* Curve

At $Q = 5$,
the marginal buyer is willing to pay \$50 for a football.

Suppose $P = \$30$.

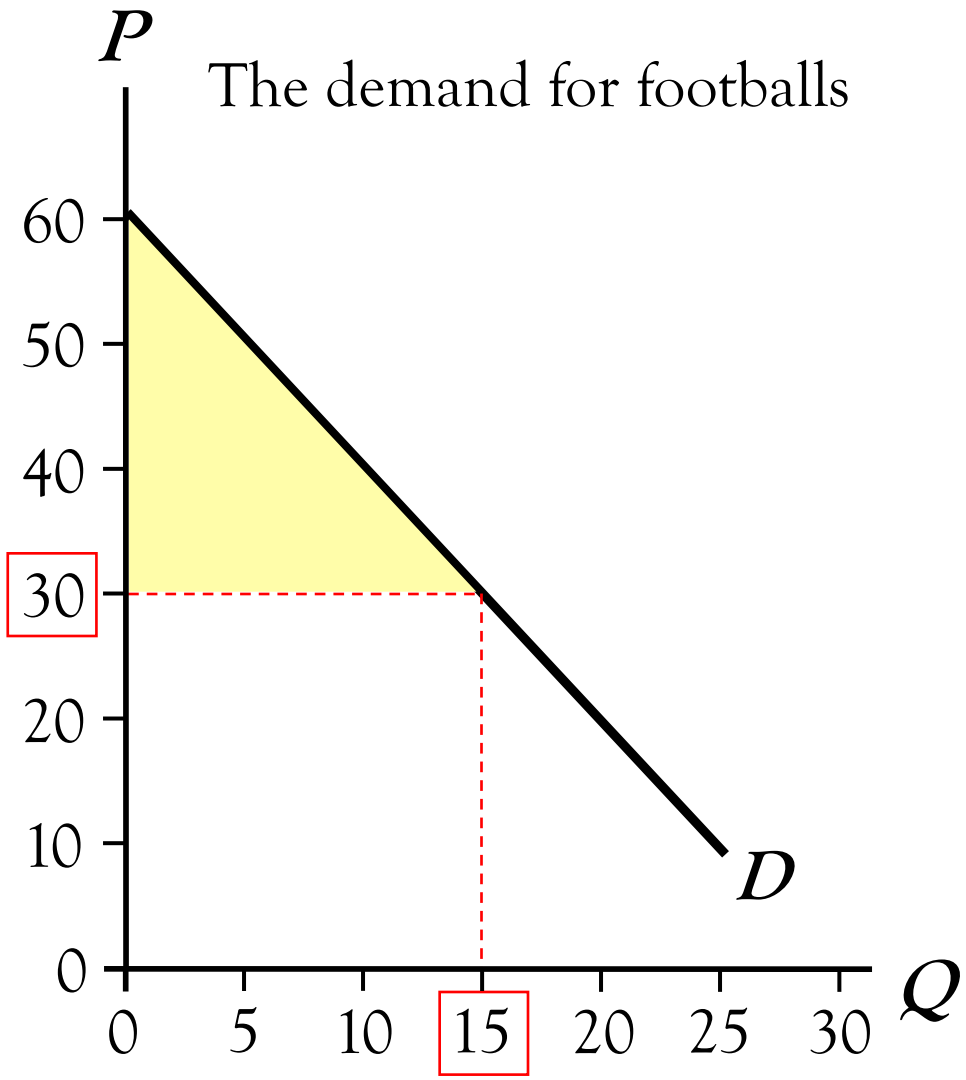
Then his consumer surplus = \$20.



CS with Many Buyers and a Smooth *D* Curve

CS is the area
below the *D* curve,
above the price,
from 0 to *Q*.

CS = ½ x 15 x ($60–$30)
= $225



How a Higher Price Reduces CS

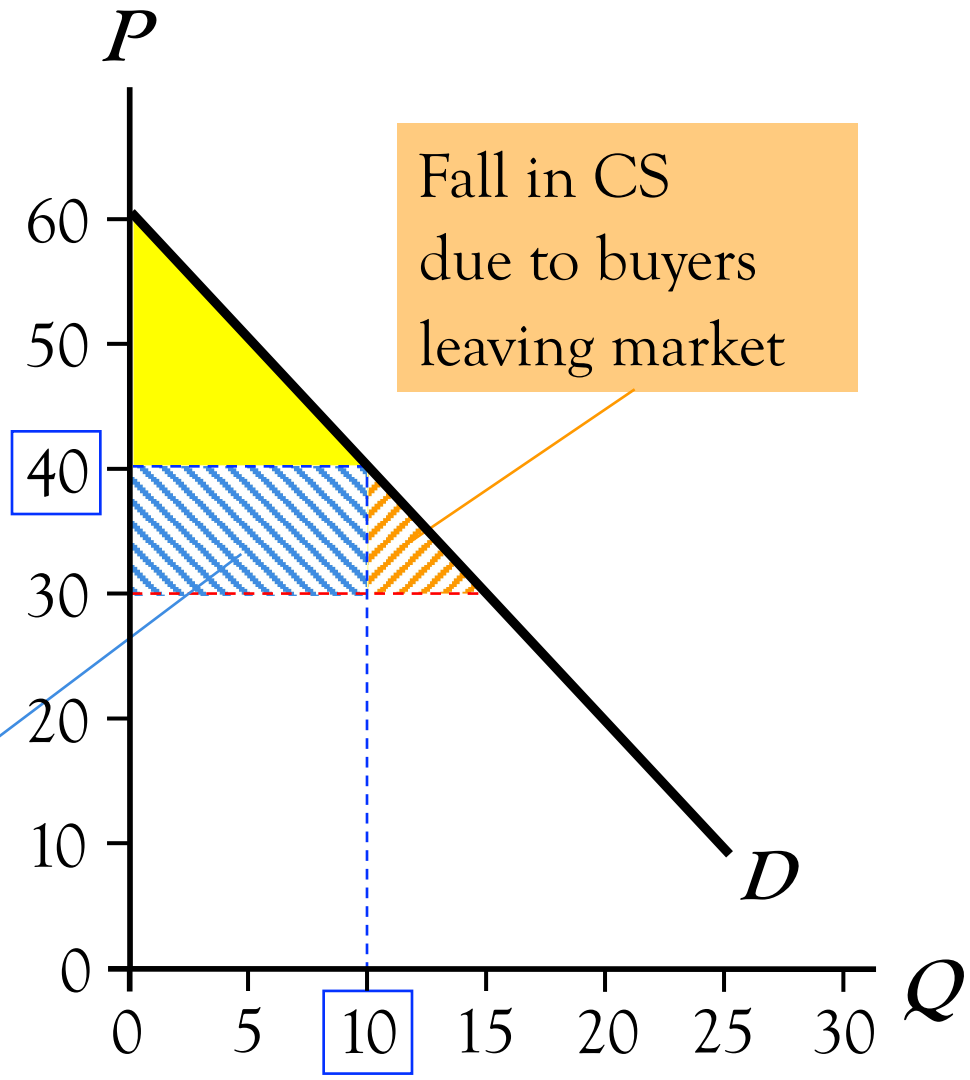
Suppose *P* rises to $40.

CS = ½ x 10 x ($60–$40)

= $100

Two reasons for the fall in CS.

Fall in CS due to remaining buyers paying higher *P*



ACTIVE LEARNING *3.6*
Consumer Surplus

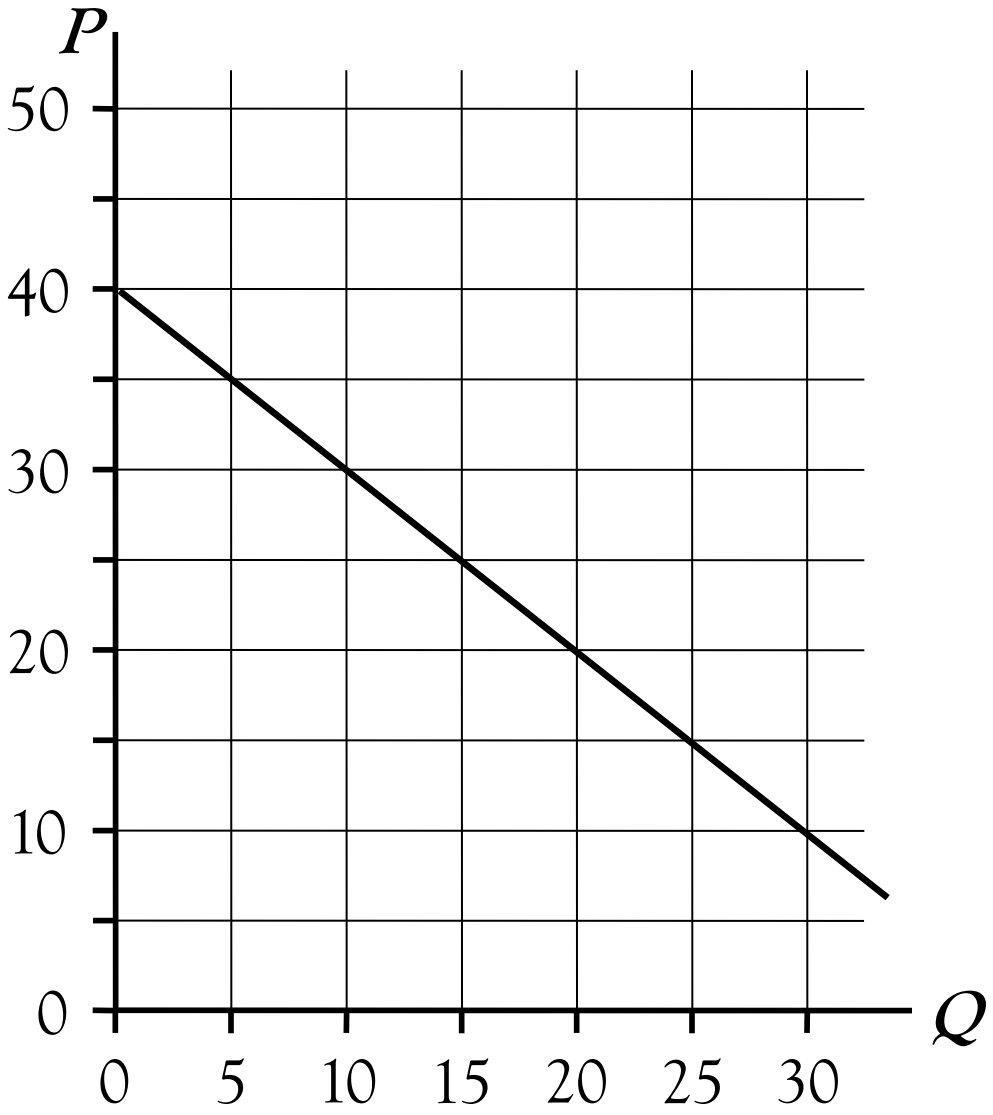
A. Find the marginal buyer's WTP at $Q = 10$.

B. Find CS for $P = \$30$.

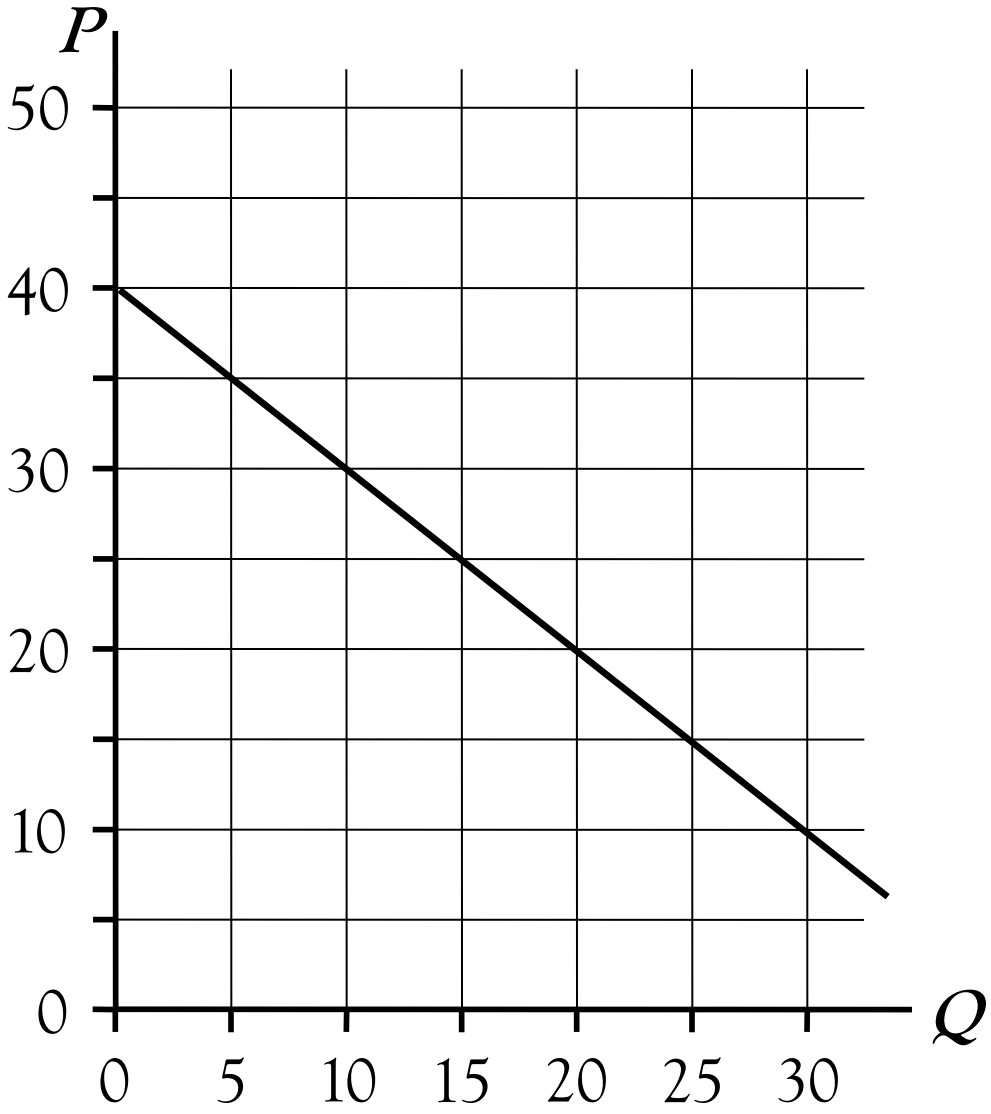
Suppose P falls to \$20. How much will CS increase due to:

C. buyers entering the market

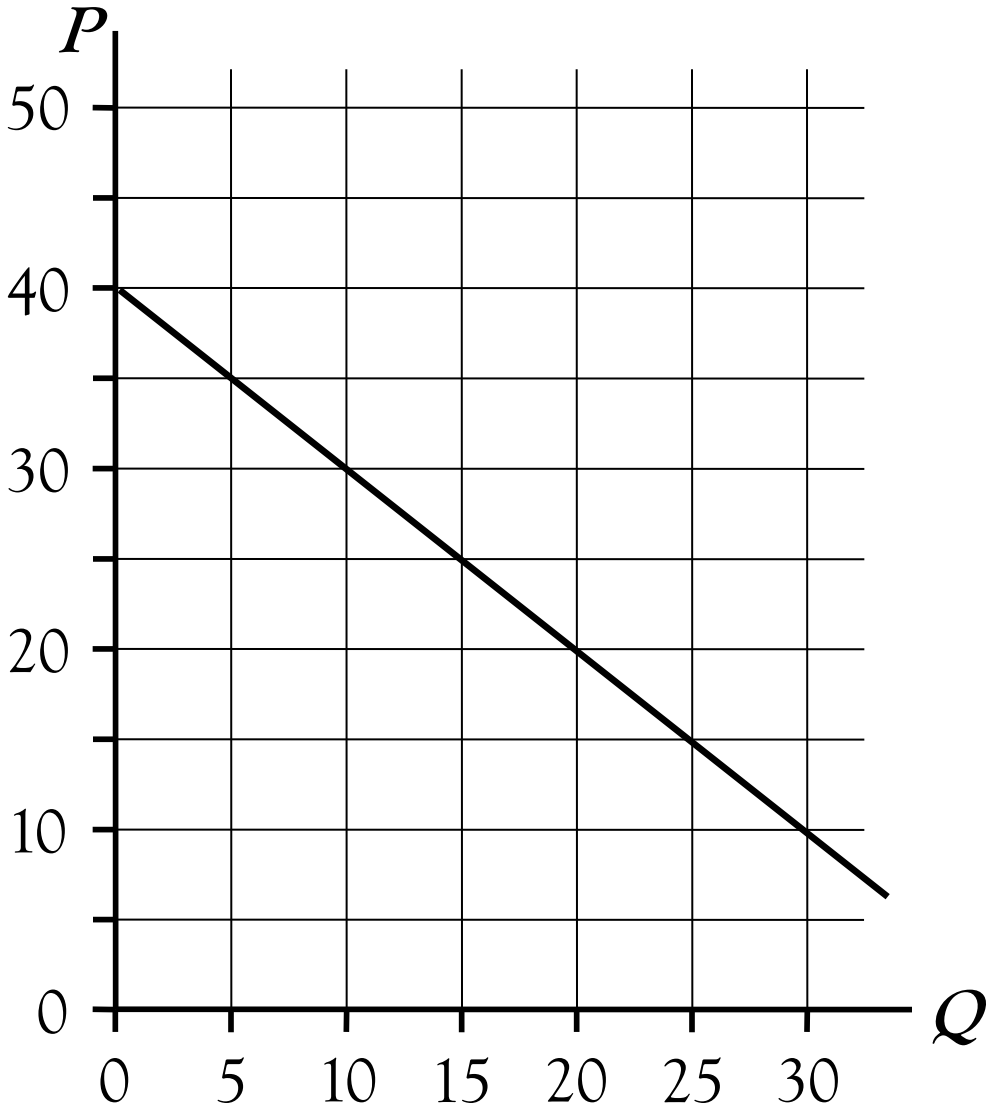
D. existing buyers paying a lower price



ACTIVE LEARNING *3.6*
Consumer Surplus



ACTIVE LEARNING *3.6*
Consumer Surplus



The Efficiency of Markets:
Cost and Producer Surplus

Cost

- **Cost** is the *value* of everything a seller must give up to produce a good
  (*i.e.*, opportunity cost)
  including the cost of inputs and
  the value of the seller's time.

- A seller will produce and sell a good only if
  the price
  is at least as high as his **cost.**

- Hence cost is a measure of **willingness to sell.**

Cost

Example: Sellers' cost of tutoring.

Seller	***Cost***
Peter	$10
Paul	$20
Mary	$35

Derive the supply schedule.

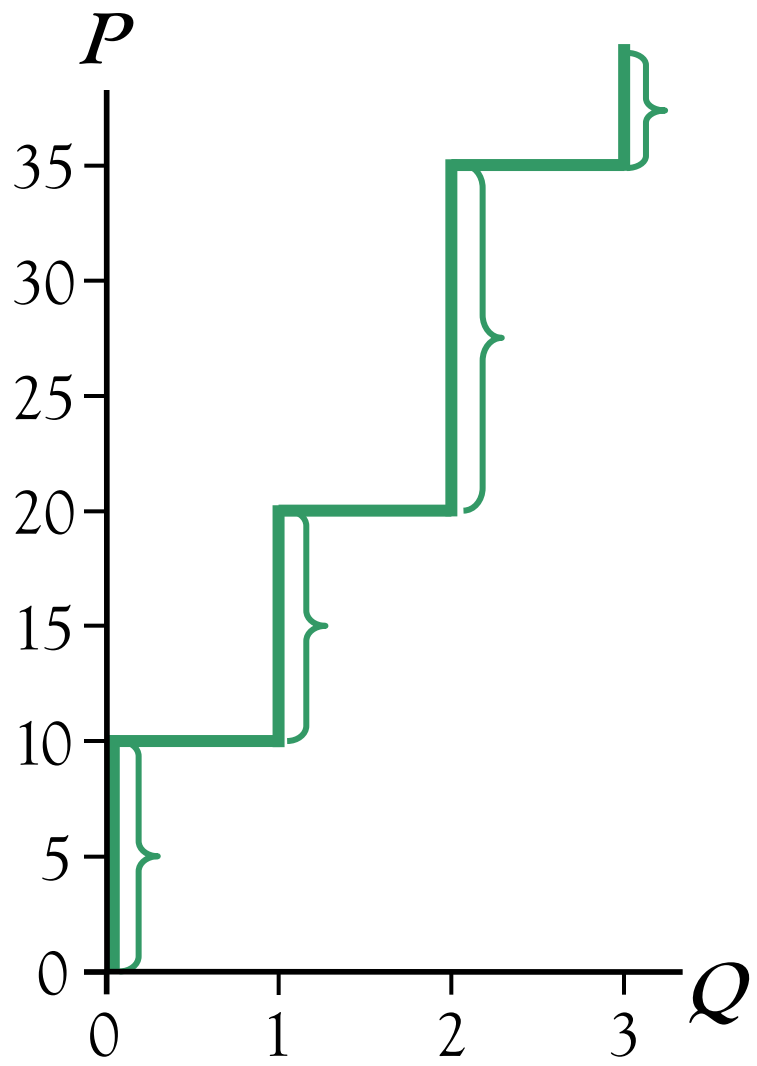
Cost and the Supply Schedule

Seller	*Cost*
Peter	$10
Paul	$20
Mary	$35

P	Q^S
$0 – $9	0
$10 – $19	1
$20 – $34	2
$35 & up	3

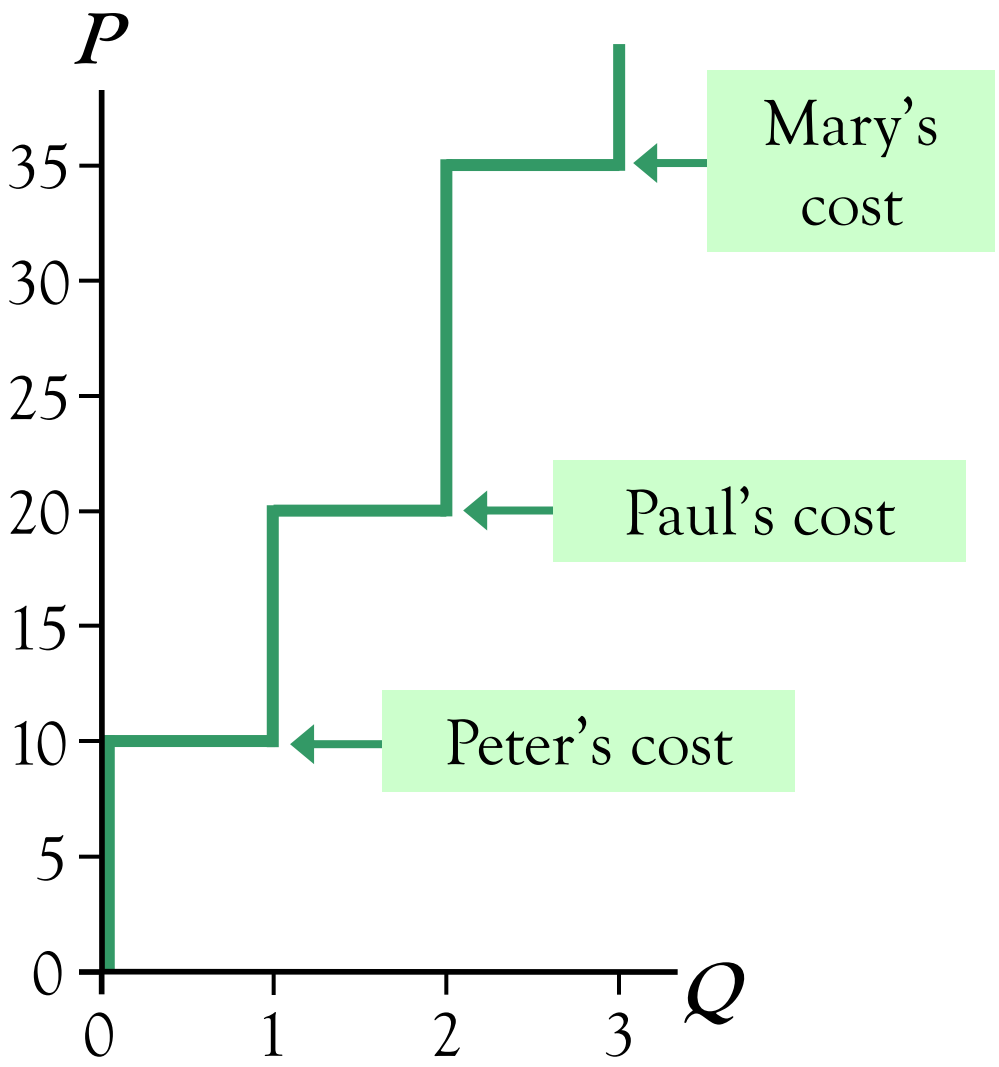
Compare Costs and Benefits

Cost and the Supply Curve



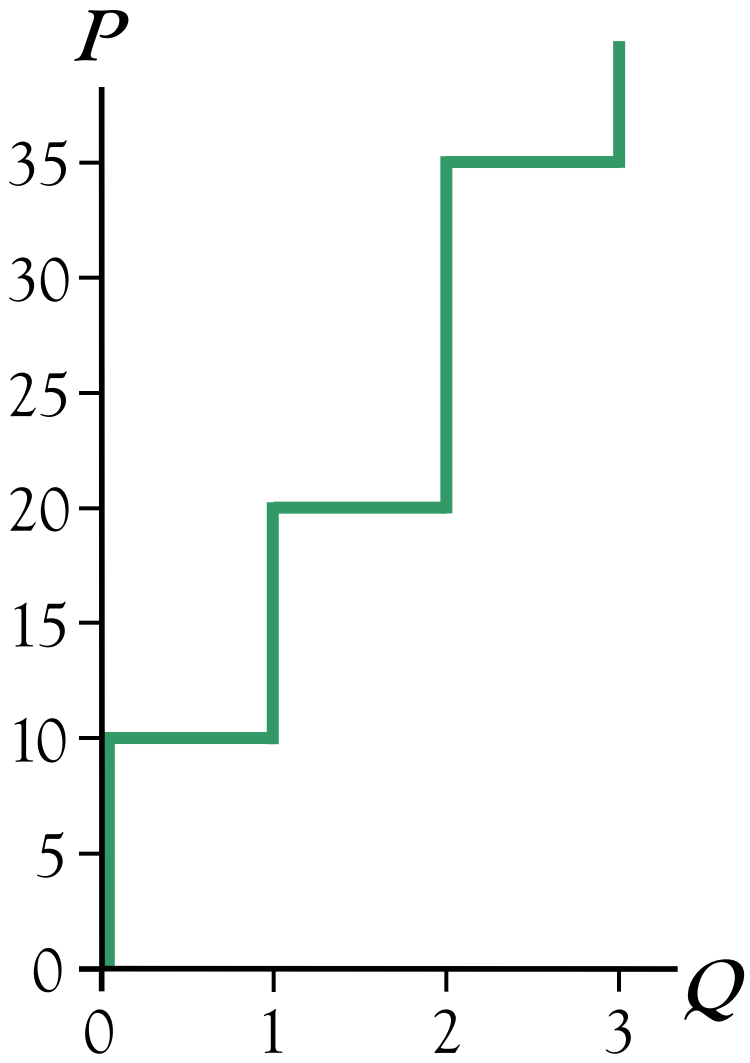
P	Q^S
\$0 – \$9	0
\$10 – \$19	1
\$20 – \$34	2
\$35 & up	3

Cost and the Supply Curve



At each ***Q***, the height of the ***S*** curve is the cost of the *marginal seller* — the seller who would leave the market if the price were any lower.

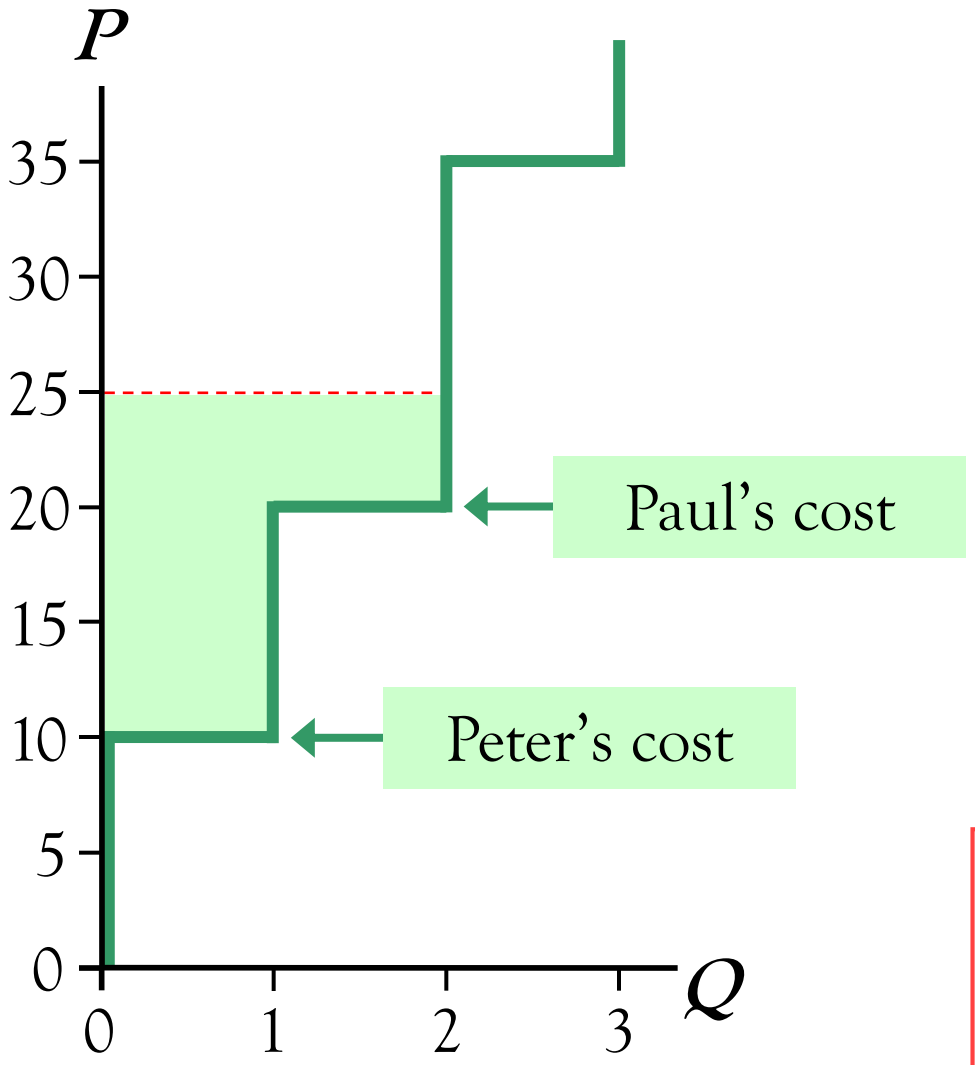
Producer Surplus (PS)



Producer surplus (PS)
is the amount
a seller is paid for a good
minus
his cost.

PS = *P* – Cost

Producer Surplus and the Supply Curve



Suppose P = \$25.

Peter's PS
= \$25 – \$10
= \$15

Paul's PS
= \$25 – \$20
= \$5

Total PS = \$20

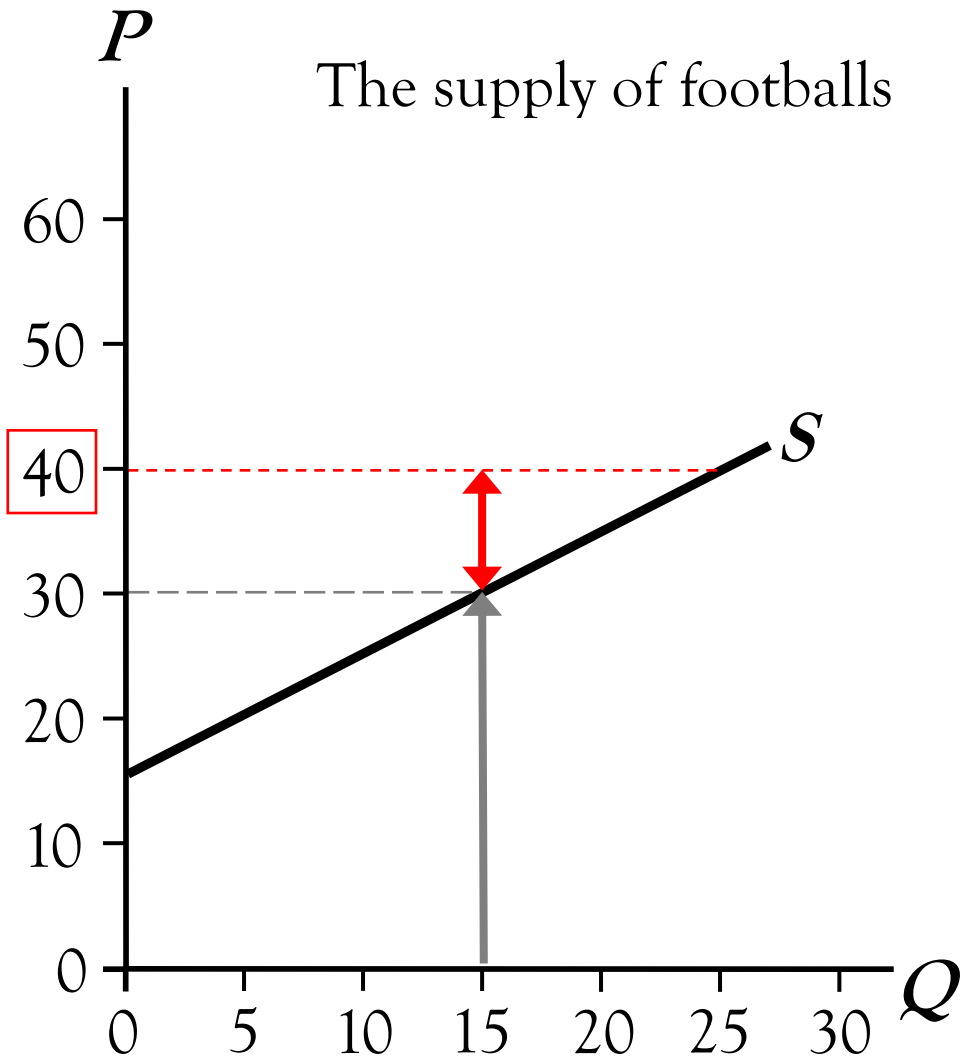
Total PS is the area above the ***S*** *curve below the price, from 0 to* ***Q****.*

PS with Many Sellers and a Smooth *S* Curve

At $Q = 15$,
the marginal seller's
cost is \$30.

Suppose $P = \$40$.

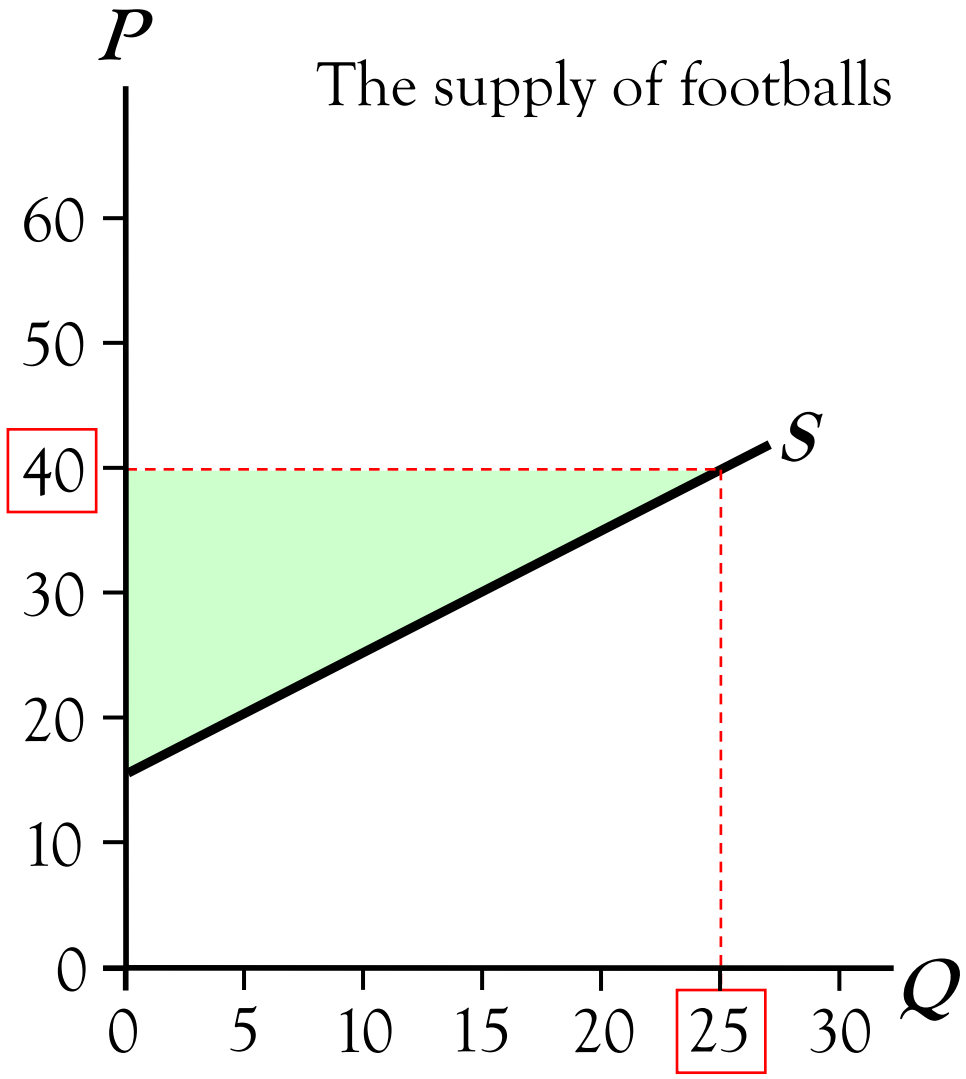
Then his producer
surplus = \$10.



PS with Many Sellers and a Smooth *S* Curve

PS is the area
above the ***S*** curve,
below the price,
from 0 to ***Q***.

PS = ½ x 25 x($40–$15)
= $312.50



How a Lower Price Reduces PS

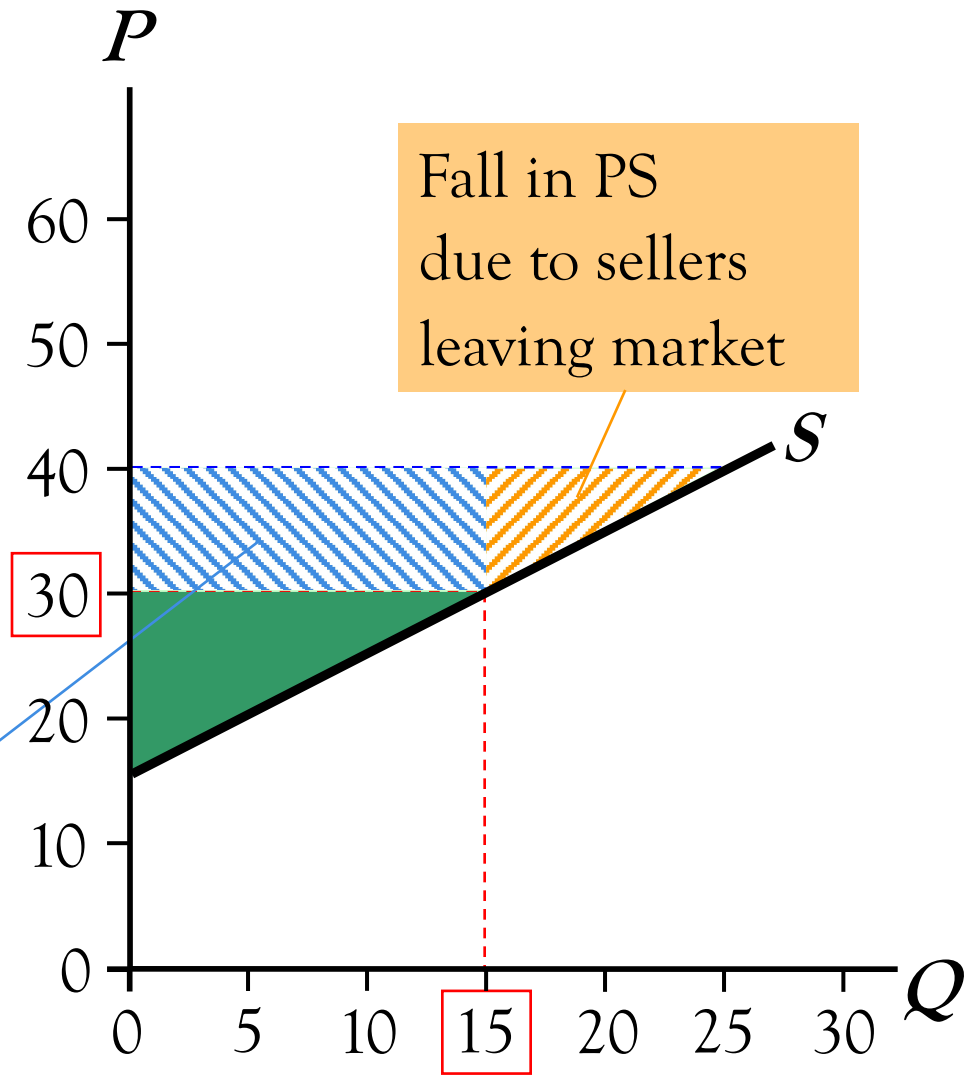
Suppose P falls to \$30.

PS = ½ x 15 x \$15

= \$112.50

Two reasons for the fall in PS.

Fall in PS due to remaining sellers getting lower P



ACTIVE LEARNING *3.7*
Producer Surplus

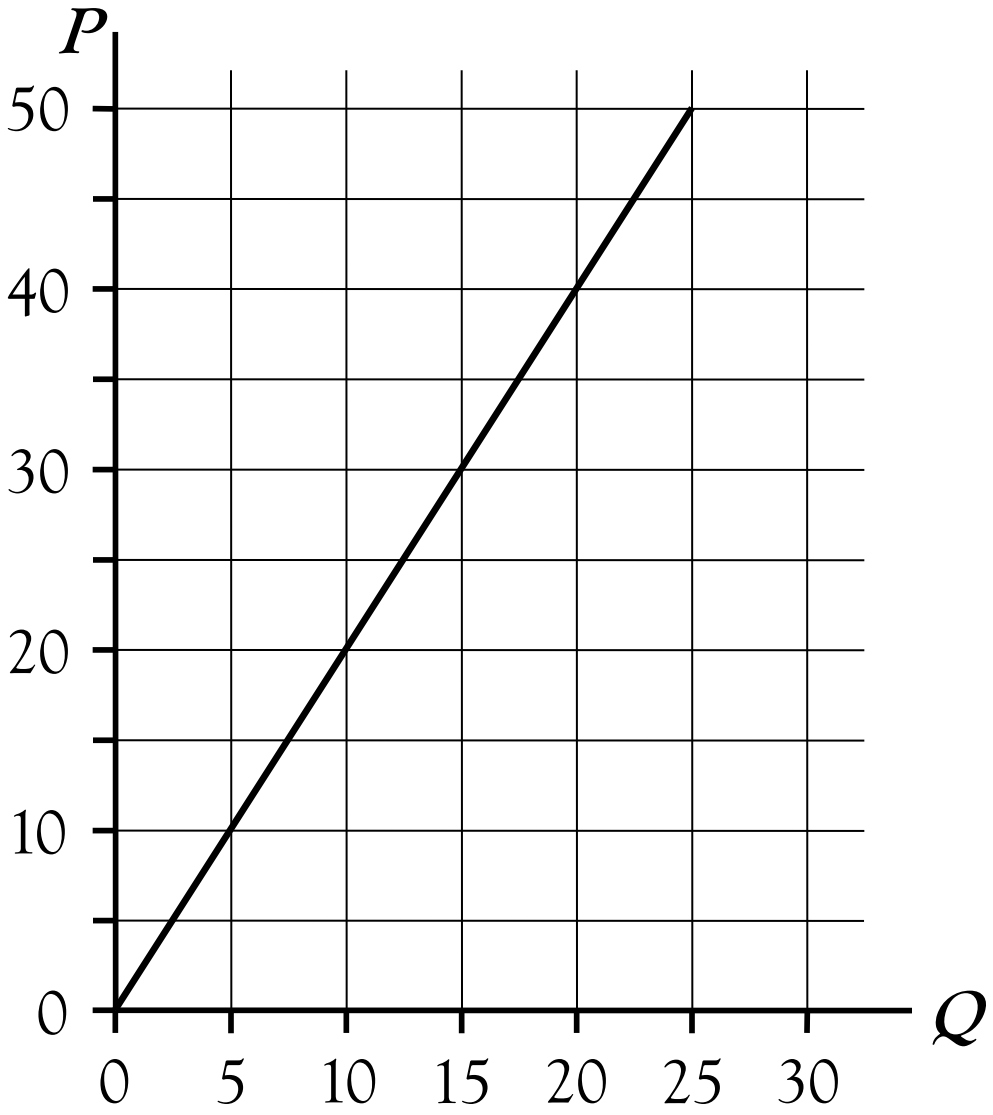
A. Find the marginal seller's cost at $Q = 10$.

B. Find total PS for $P = \$20$.

Suppose P rises to \$30. How much will PS increase due to:

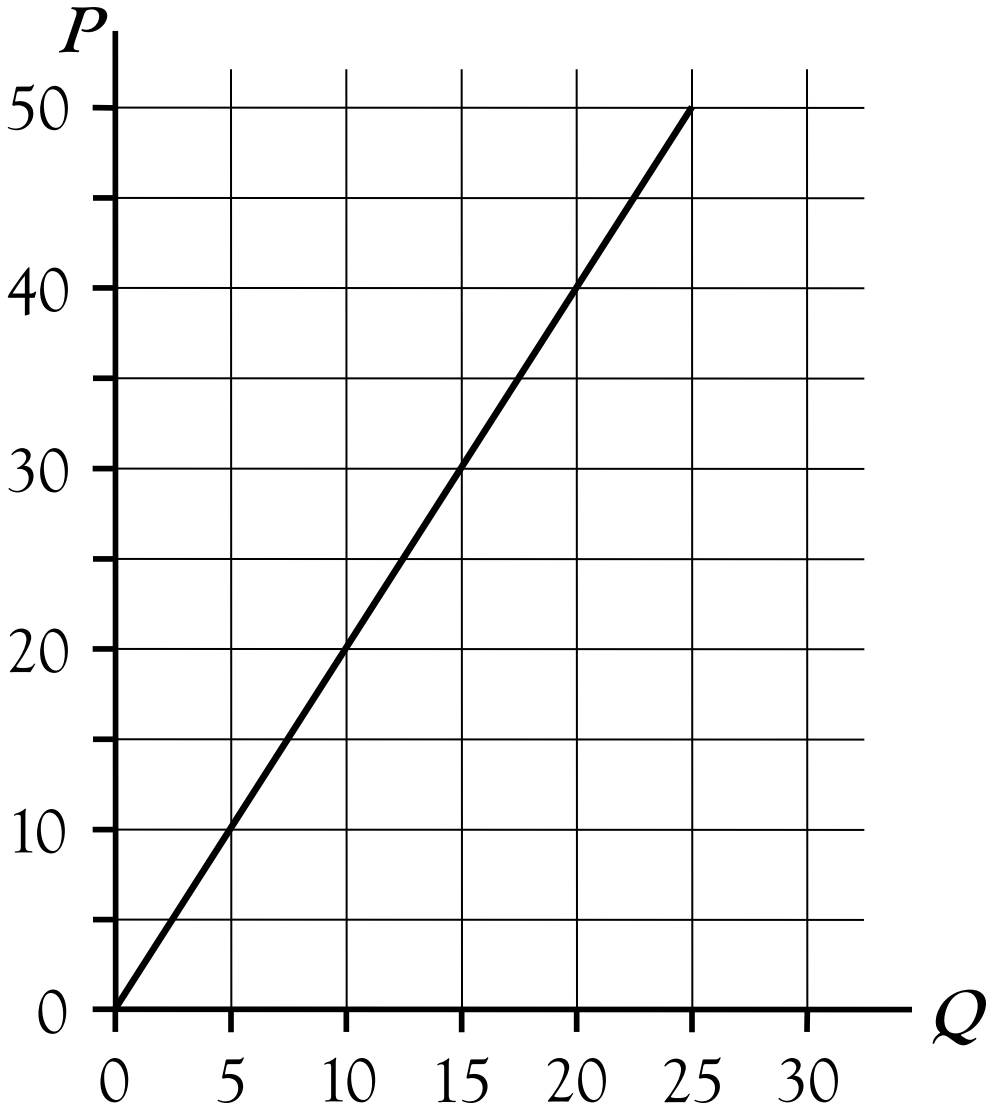
C. sellers entering the market

D. existing sellers getting a higher price



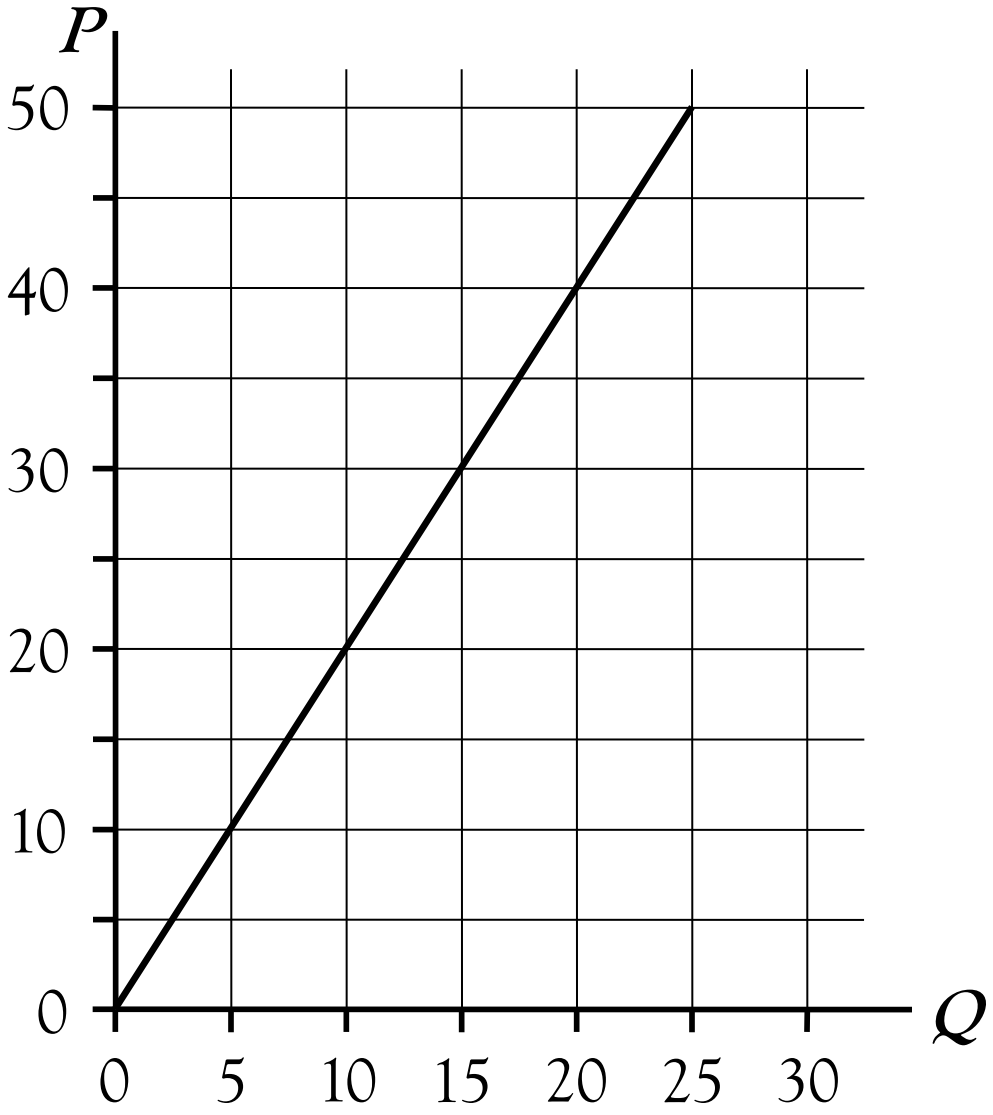
ACTIVE LEARNING *3.7*

Producer Surplus



ACTIVE LEARNING *3.7*

Producer Surplus



The Efficiency of Markets:
Total Surplus and Efficiency

CS, PS, and Total Surplus

CS = Value to Buyers – ***P***

= buyers' gains from participating in the market

PS = ***P*** – Cost to Sellers

= sellers' gains from participating in the market

Total Surplus = CS + PS

= Value to Buyers – Cost to Sellers

= total gains from trade

The Market's Allocation of Resources

- In a market economy,
  the allocation of resources is decentralized,
  determined by the interactions of many self-interested buyers and sellers.

- Is the market's allocation of resources desirable?
  Or would a different allocation of resources make society better off?

- To answer this, we use **total surplus** as a measure of society's well-being, and we consider whether the market's allocation is **efficient.**

Efficiency

Total Surplus = Value to Buyers – Cost to Sellers

- An allocation of resources is **efficient** if it *maximizes* total surplus.
- Efficiency means:
  - The goods are consumed by the *buyers* who value them *most highly.*
  - The goods are produced by the *sellers* with the *lowest cost.*

Efficiency

- In Harford (TUE), Chapter 3:
- A set of interconnected *perfectly competitive markets* results in:
  - Companies making things the right way.
  - Companies making the right things.
  - Things being made in the right proportions.
  - Things going to the "right" people.

Evaluating the Market Equilibrium

Market equilibrium:

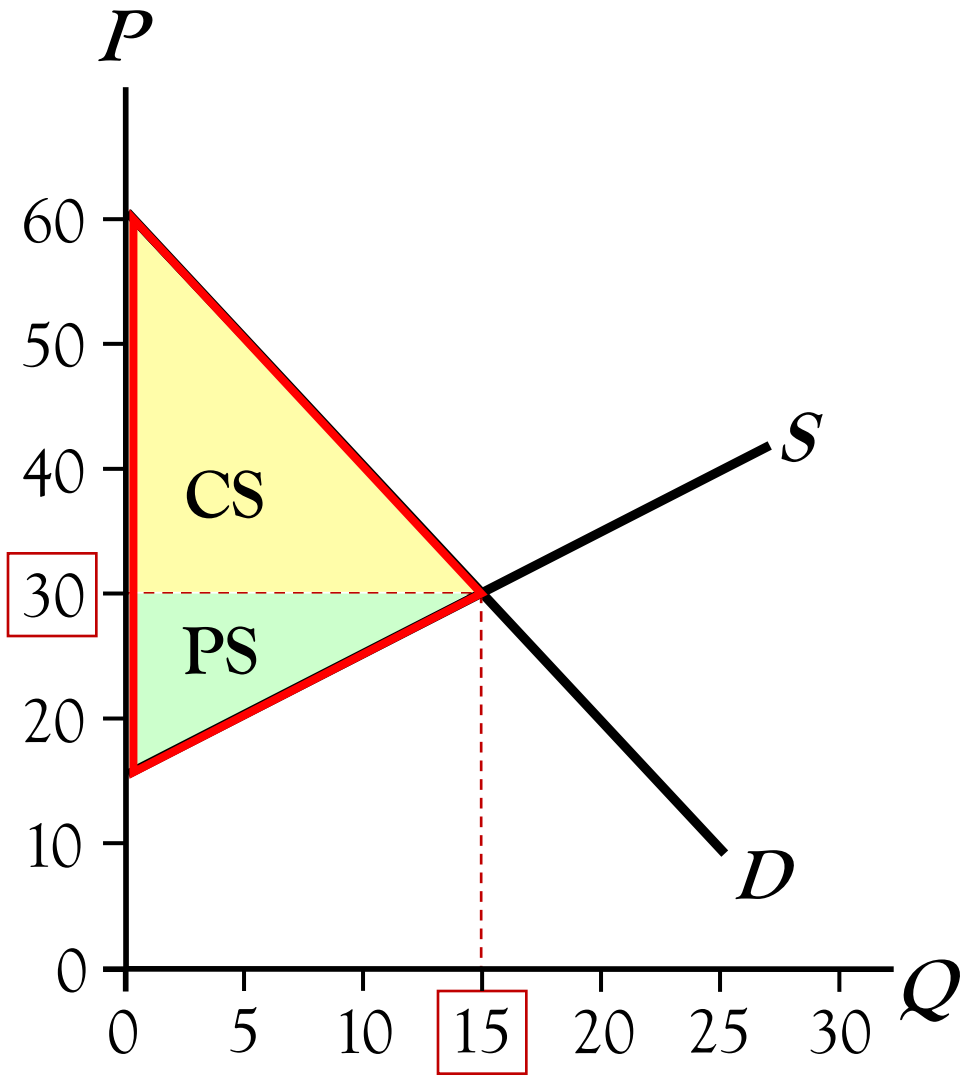
P = \$30

Q = 15,000

Total surplus

= CS + PS

Is the market equilibrium efficient?

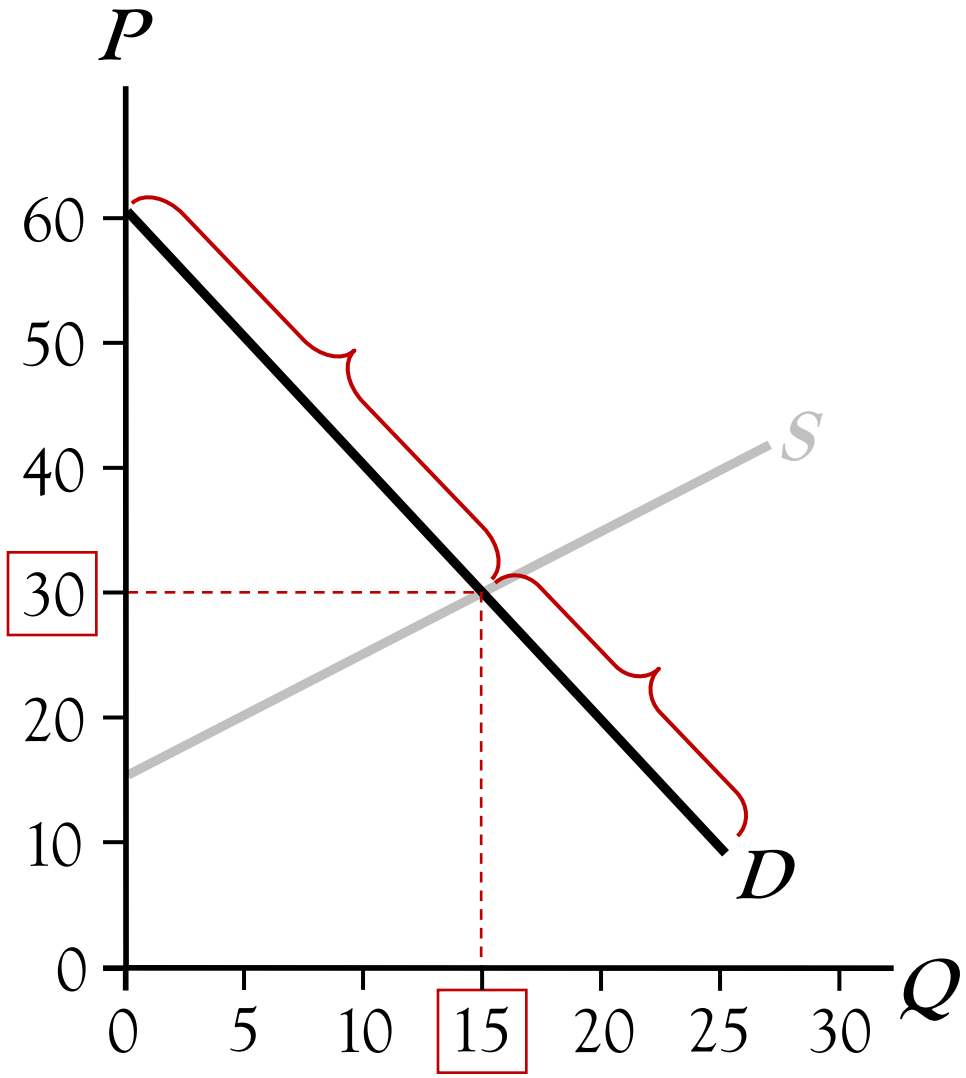


Which Buyers Consume the Good?

Every buyer
whose WTP is ≥ $30
will buy the good.

Every buyer
whose WTP is < $30
will not buy the good.

The buyers
with the highest valuation
are the ones
who consume the good.



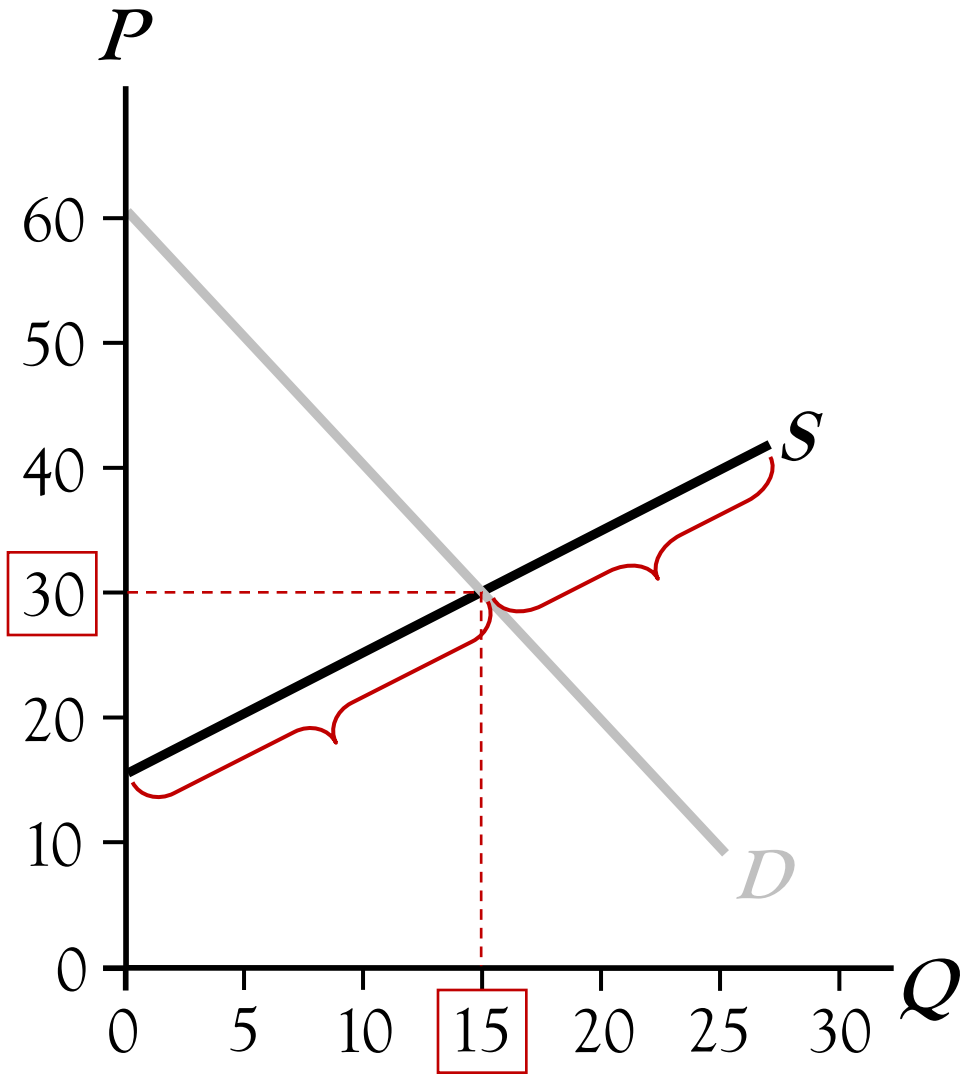
Compare Costs and Benefits

Which Sellers Produce the Good?

Every seller
whose cost is ≤ $30
will produce the good.

Every seller
whose cost is > $30
will not produce the good.

The sellers
with the lowest cost
are the ones
who produce the good.



Compare Costs and Benefits

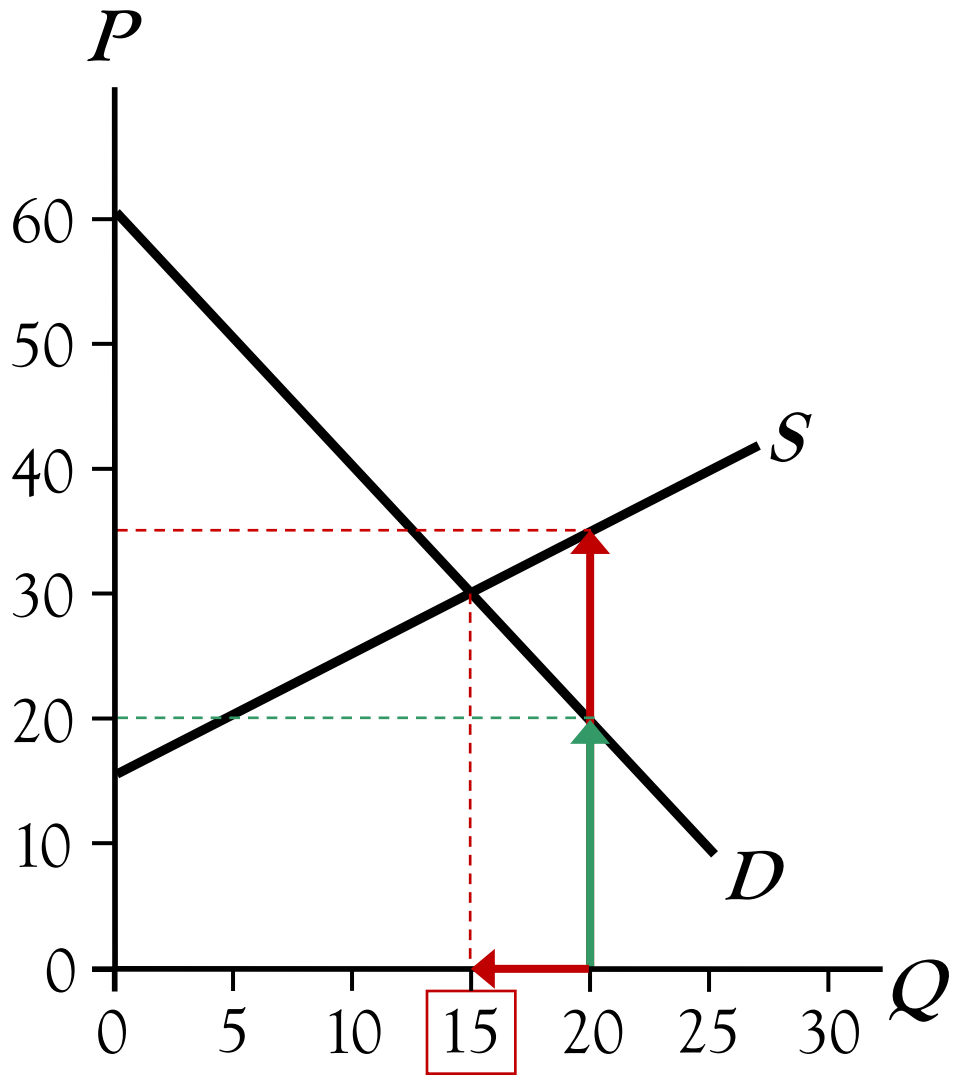
Does Q^* Maximize Total Surplus?

At $Q = 20$,
the cost of producing
the marginal unit
is \$35.

The value to consumers
of the marginal unit
is \$20.

Hence, we can increase
total surplus by ↓ Q.

This is true
at any Q greater than 15.



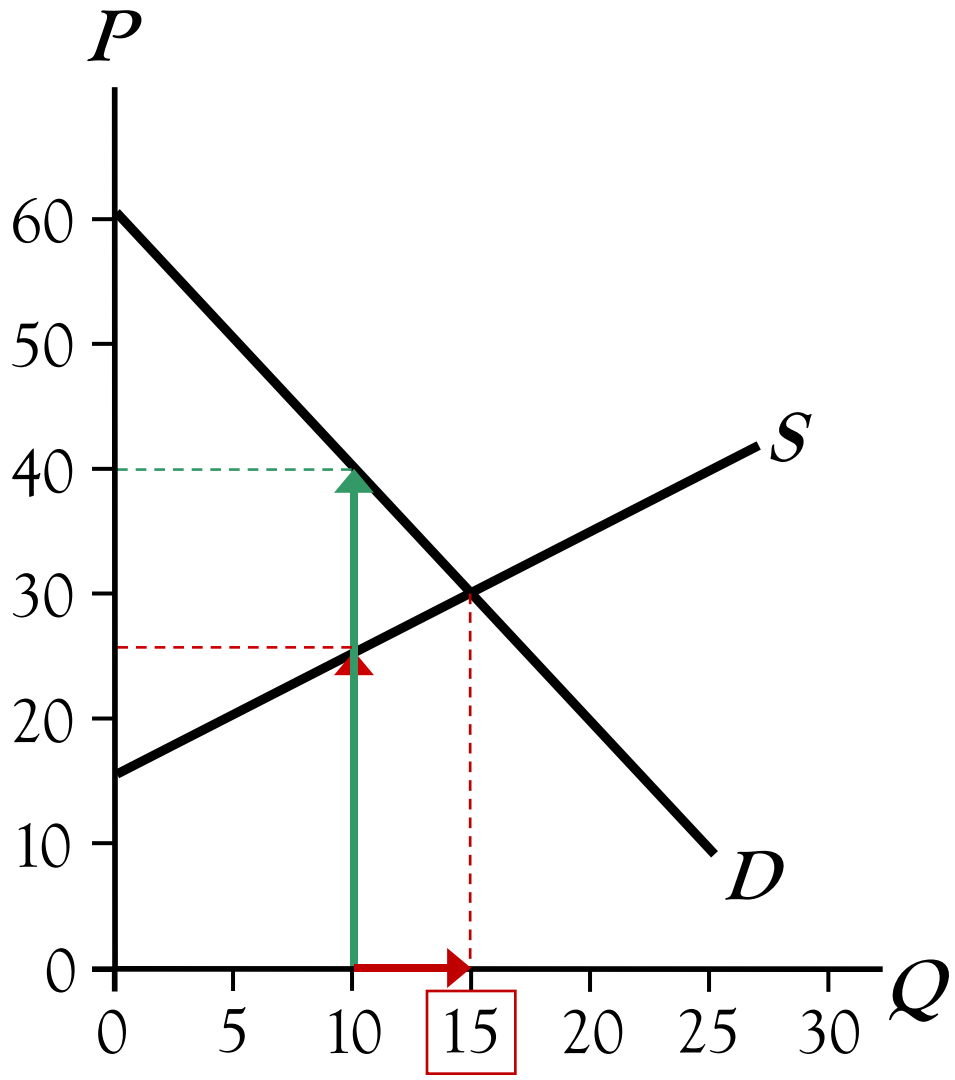
Does Q^* Maximize Total Surplus?

At $Q = 10$,
the cost of producing
the marginal unit
is $25.

The value to consumers
of the marginal unit
is $40.

Hence, we can increase
total surplus by ↑ Q.

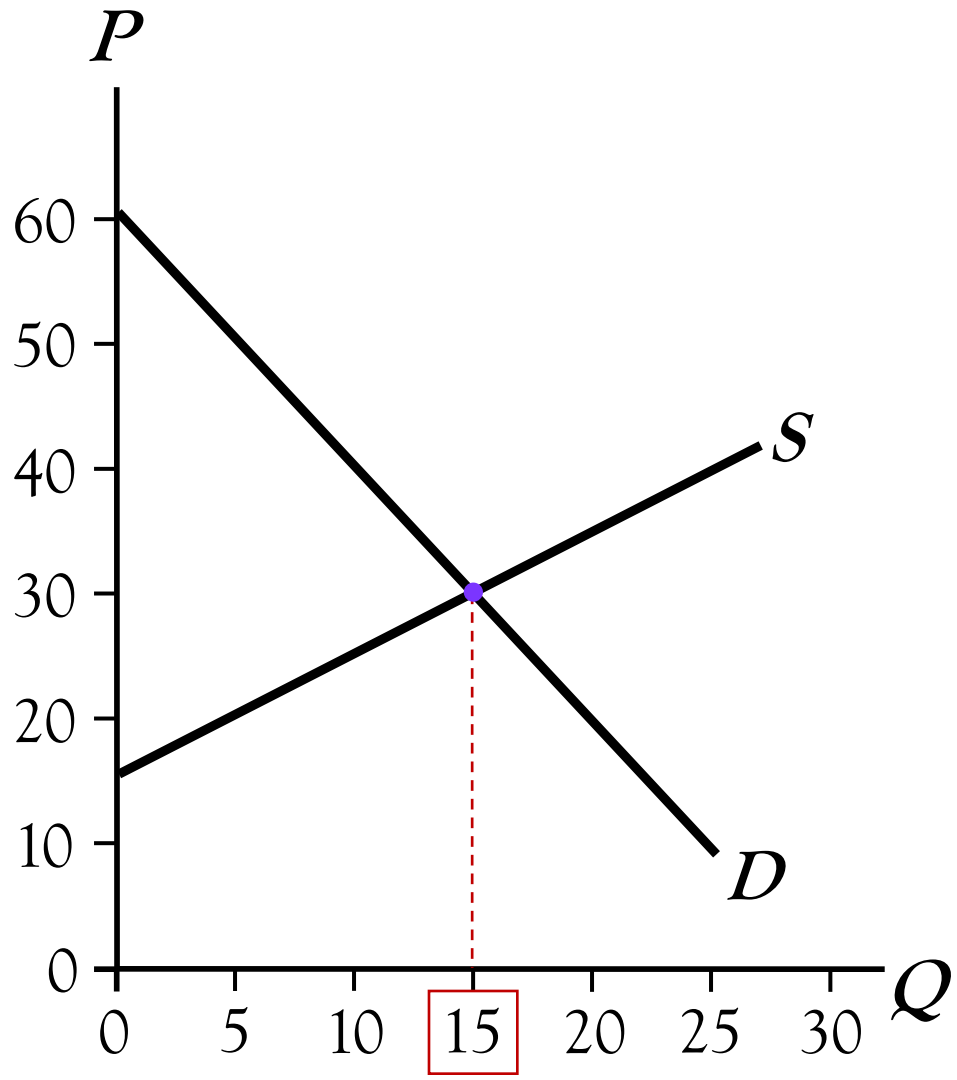
This is true
at any Q less than 15.



Does Q^* Maximize Total Surplus?

Q^* (the market equilibrium quantity) maximizes total surplus.

At any other quantity, we can increase total surplus by moving toward Q^*.



"It is not from the benevolence of the butcher, the brewer,
or the baker that we expect our dinner,
but from their regard to their own interest ...

Every individual ... neither intends to promote the public interest,
nor knows how much he is promoting it ...

He intends only his own gain, and he is in this,
as in many other cases, led by an **invisible hand**
to promote an end which was no part of his intention.

Nor is it always the worse for the society that it was no part of it.

By pursuing his own interest
he frequently promotes that of the society more effectually
than when he really intends to promote it."

Adam Smith, *The Wealth of Nations*, 1776

Market Economy

- The **invisible hand** works through the **price** system.
  - The interaction of buyers and sellers determines **prices.**
  - Each price reflects
    - the buyer's *valuation* of the good and
    - the seller's *cost* of producing the good.
  - Prices guide self-interested households and firms to allocate resources such that society's well-being is *maximized.*

Market Economy vs. Government Intervention

- Assuming perfectly competitive markets,
  the market equilibrium is *efficient.*
- No other outcome achieves higher total surplus.
- The government cannot raise total surplus by changing the market's *allocation of resources.*

Market Economy vs. Central Planning

- Suppose resources were allocated not by the market,
  but by a central planner who cares about society's well-being.

- To allocate resources efficiently and maximize total surplus,
  the central planner would need to know
  every seller's *cost* and
  every buyer's *WTP*
  for *every* good in the entire economy.

- This is impossible, which is why centrally-planned economies
  are never very efficient.

First Fundamental Theorem of Welfare Economics

- Assume that:
  - There are *markets* and *market prices* for all goods.
  - All buyers and sellers are *competitive price-takers.*
  - Each person's utility depends *only on his own consumption.*
- Then any market equilibrium is **efficient.**

Market Failures

- If any of the assumptions do not hold,
  e.g., if markets are not perfectly competitive,
  then resources may not be allocated efficiently.

- Examples of market failures:
  - Markets are **not perfectly competitive,**
    i.e., a buyer or seller has **market power**
    — the ability to affect the market price.
  - Transactions have **externalities**
    — side effects that affect bystanders, *e.g.*, pollution.

Test Yourself

- Consumer surplus =
- Producer surplus =
- Total surplus =

- An allocation of resources that maximizes total surplus is _____.

Test Yourself

- Under certain assumptions, _____ maximizes total surplus.
- These assumptions are:
- Examples of market failure: