

Chapter 7 – Consumers, Producers and The Efficiency of Markets

***In this chapter,
look for the answers to these questions:***

- What is consumer surplus? How is it related to the demand curve?
- What is producer surplus? How is it related to the supply curve?
- Do markets produce a desirable allocation of resources? Or could the market outcome be improved upon?

Welfare Economics

- Recall, the **allocation of resources** refers to:
 - how much of each good is produced
 - which producers produce it
 - which consumers consume it
- **Welfare economics** studies how the allocation of resources affects economic well-being.
- First, we look at the well-being of consumers.

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.

<i>name</i>	<i>WTP</i>
Anthony	\$250
Chad	175
Flea	300
John	125

Example:
4 buyers' WTP
for an iPod

WTP and the Demand Curve

Q: If price of iPod is \$200, who will buy an iPod, and what is quantity demanded?

A: Anthony & Flea will buy an iPod, Chad & John will not.

Hence, $Q^d = 2$
when $P = \$200$.

<i>name</i>	<i>WTP</i>
Anthony	\$250
Chad	175
Flea	300
John	125

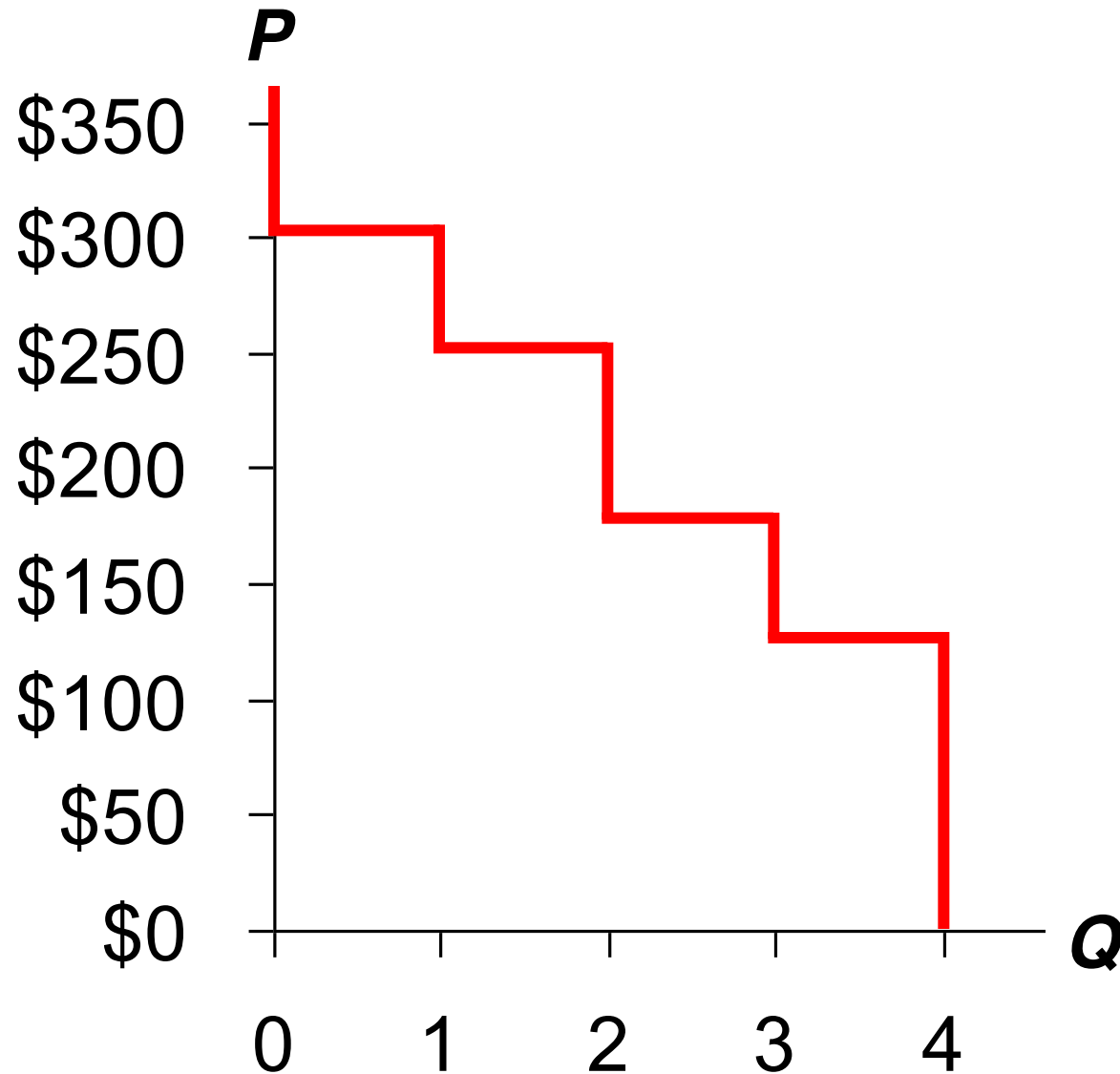
WTP and the Demand Curve

Derive the demand schedule:

<i>name</i>	<i>WTP</i>
Anthony	\$250
Chad	175
Flea	300
John	125

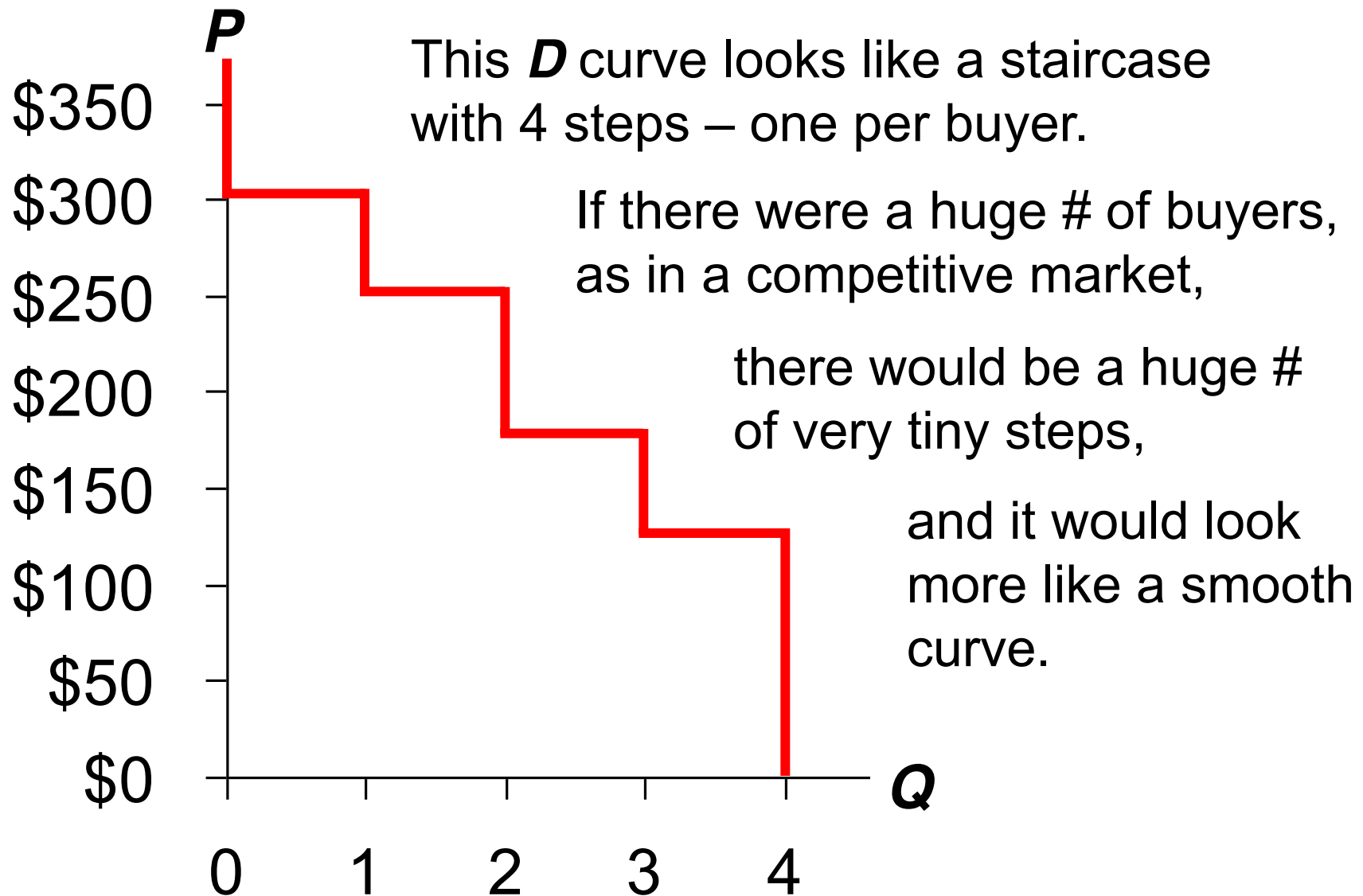
<i>P</i> (price of iPod)	who buys	<i>Q^d</i>
\$301 & up	nobody	0
251 – 300	Flea	1
176 – 250	Anthony, Flea	2
126 – 175	Chad, Anthony, Flea	3
0 – 125	John, Chad, Anthony, Flea	4

WTP and the Demand Curve

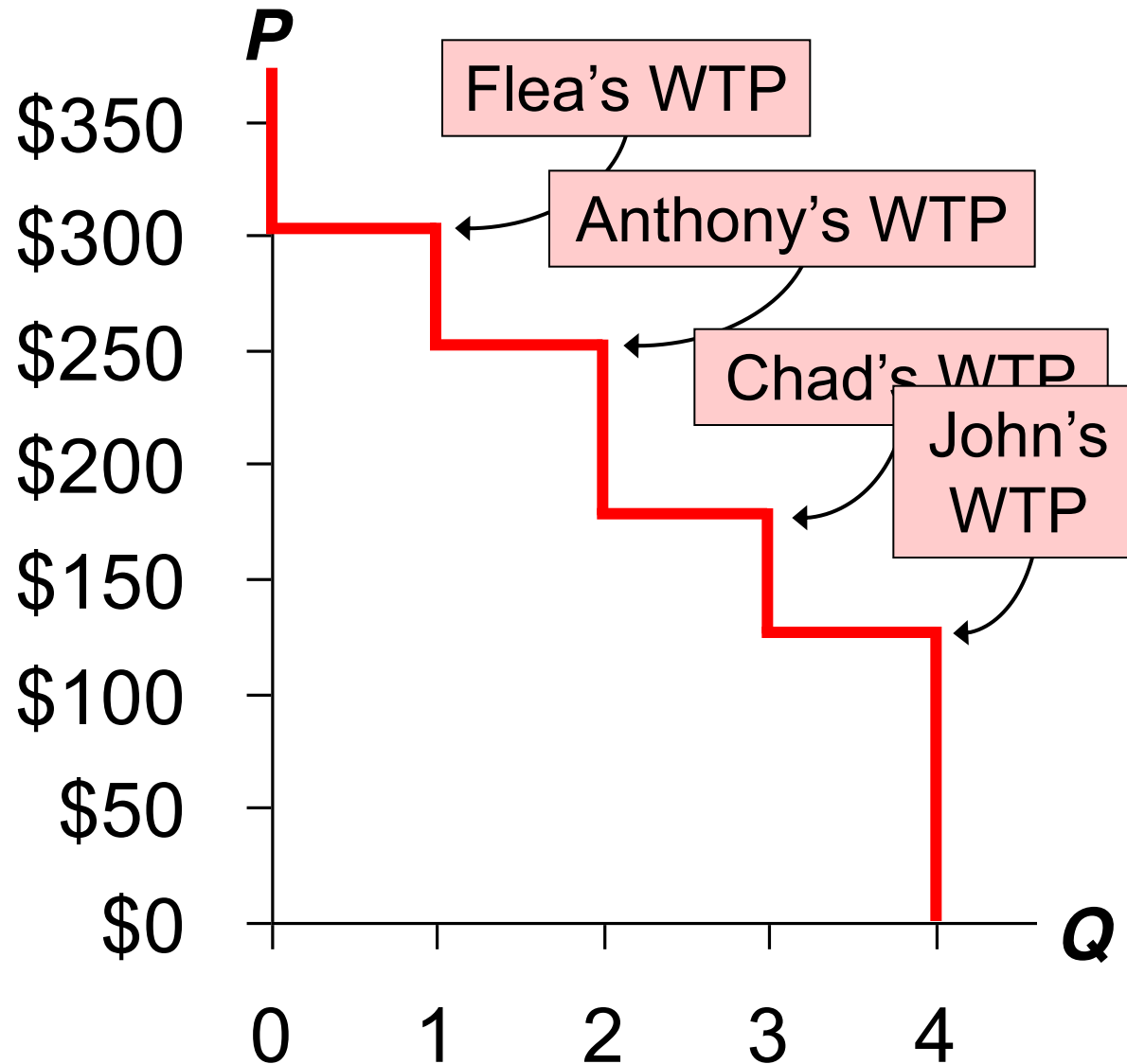


P		Q^d
\$301 & up		0
251 – 300		1
176 – 250		2
126 – 175		3
0 – 125		4

About the Staircase Shape...



WTP and the Demand Curve



At any 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 is the amount a buyer is willing to pay minus the amount the buyer actually pays:

$$CS = WTP - P$$

<i>name</i>	<i>WTP</i>
Anthony	\$250
Chad	175
Flea	300
John	125

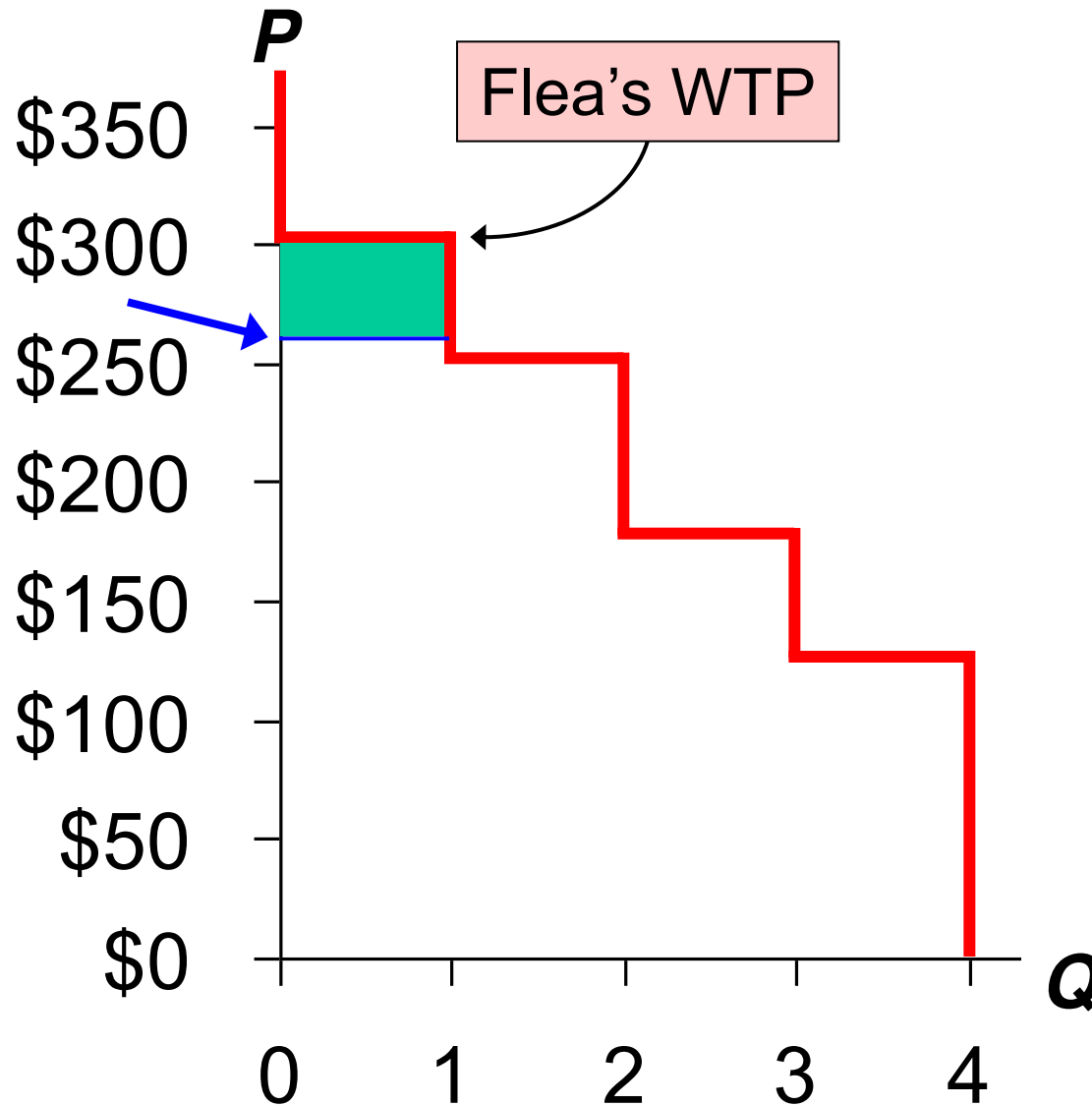
Suppose $P = \$260$.

Flea's CS = $\$300 - 260 = \40 .

The others get no CS because they do not buy an iPod at this price.

Total CS = \$40.

CS and the Demand Curve

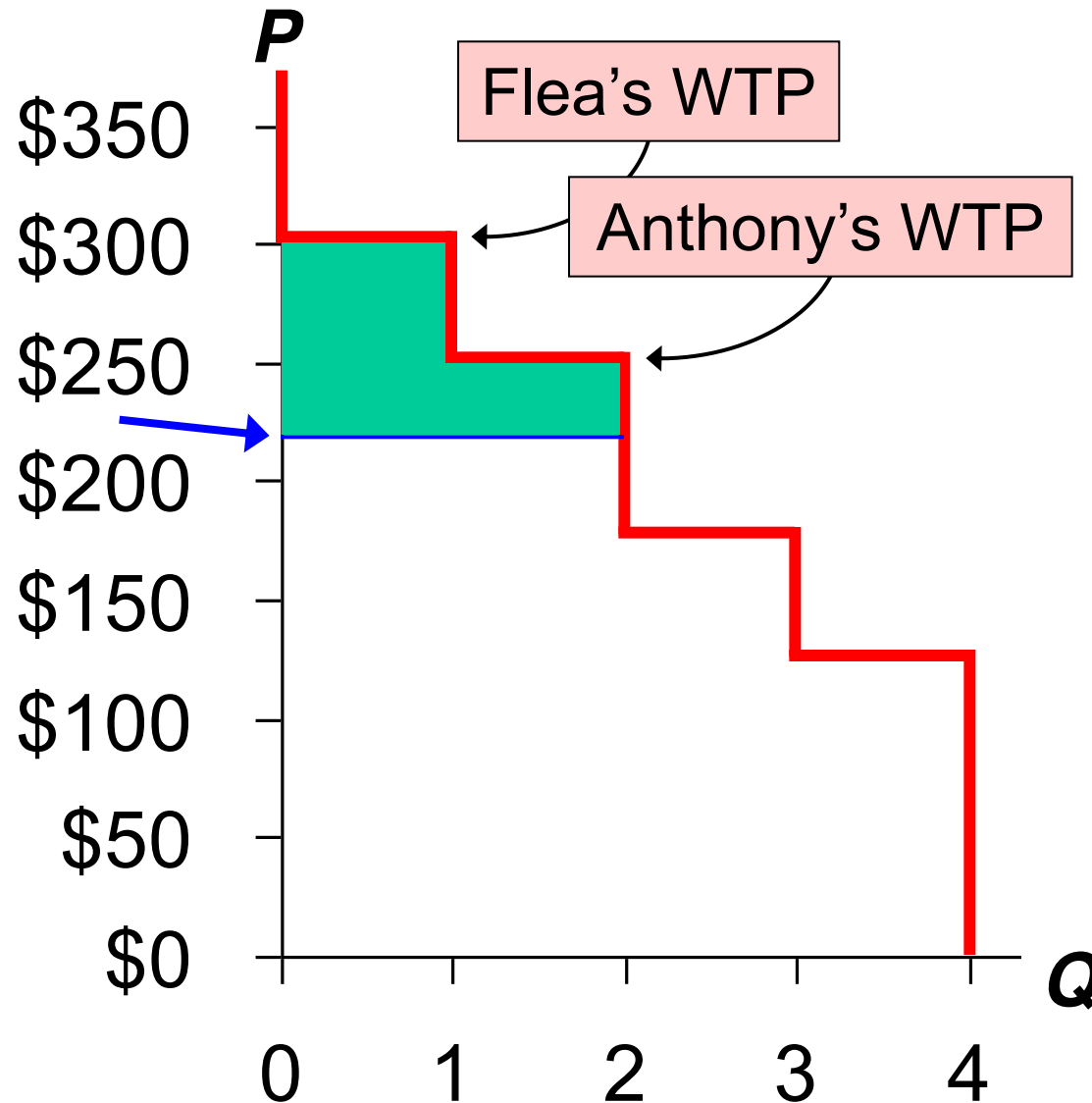


$$P = \$260$$

$$\text{Flea's CS} = \$300 - 260 = \underline{\$40}$$

$$\text{Total CS} = \underline{\$40}$$

CS and the Demand Curve



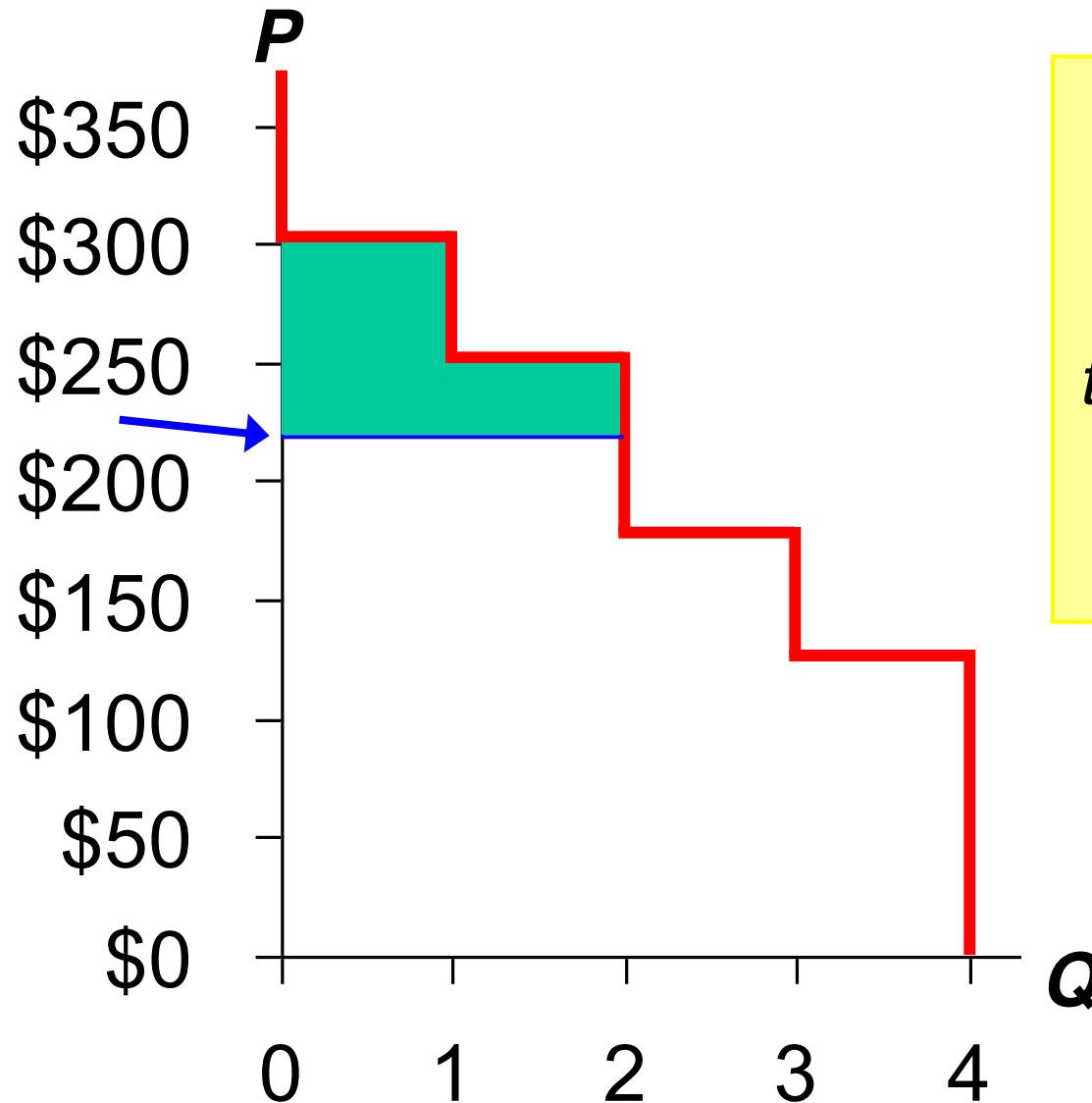
Instead, suppose
 $P = \$220$

Flea's CS =
 $\$300 - 220 = \underline{\$80}$

Anthony's CS =
 $\$250 - 220 = \underline{\$30}$

Total CS = \$110

CS and the Demand Curve



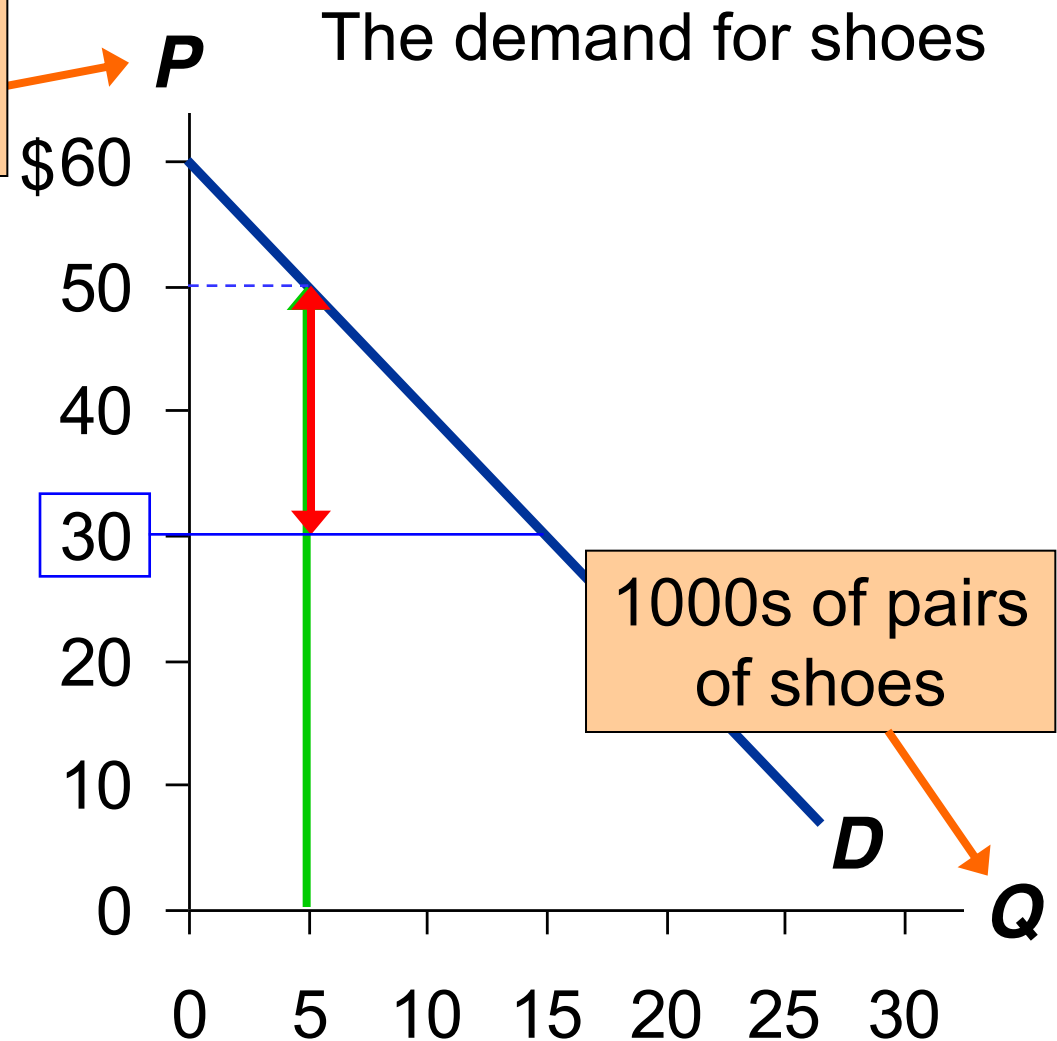
*The lesson:
Total CS equals
the area under
the demand curve
above the price,
from 0 to Q .*

CS with Lots of Buyers & a Smooth D Curve

At $Q = 5$ (thousand) the marginal buyer is willing to pay \$50 for pair of shoes.

Suppose $P = \$30$.

Then his consumer surplus = \$20.



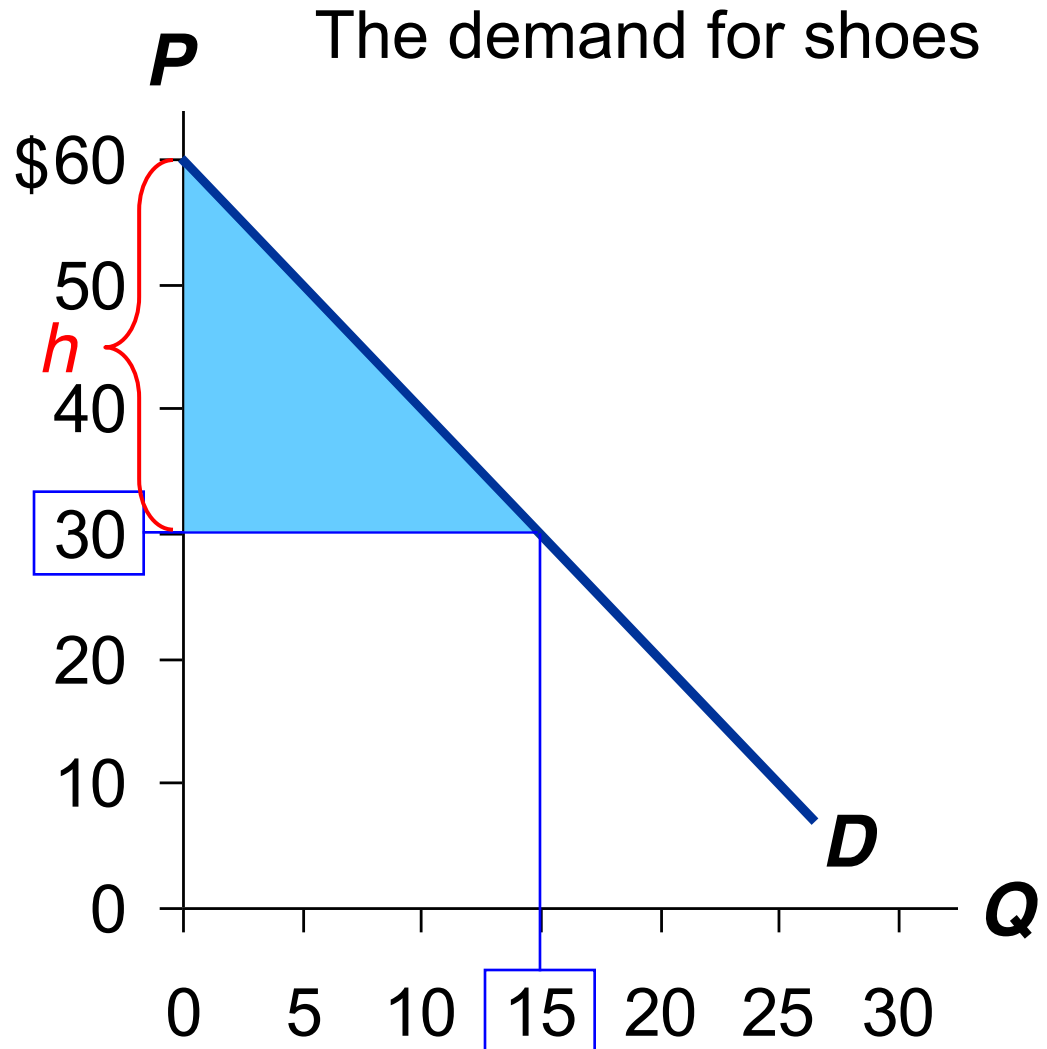
CS with Lots of Buyers & a Smooth D Curve

CS is the area b/w
P and the **D** curve,
from 0 to **Q**.

Recall: area of
a triangle equals
 $\frac{1}{2} \times \text{base} \times \text{height}$

Height =
 $\$60 - 30 = \underline{\$30}$.

So,
 $\text{CS} = \frac{1}{2} \times 15 \times \30
 $= \underline{\$225}$.

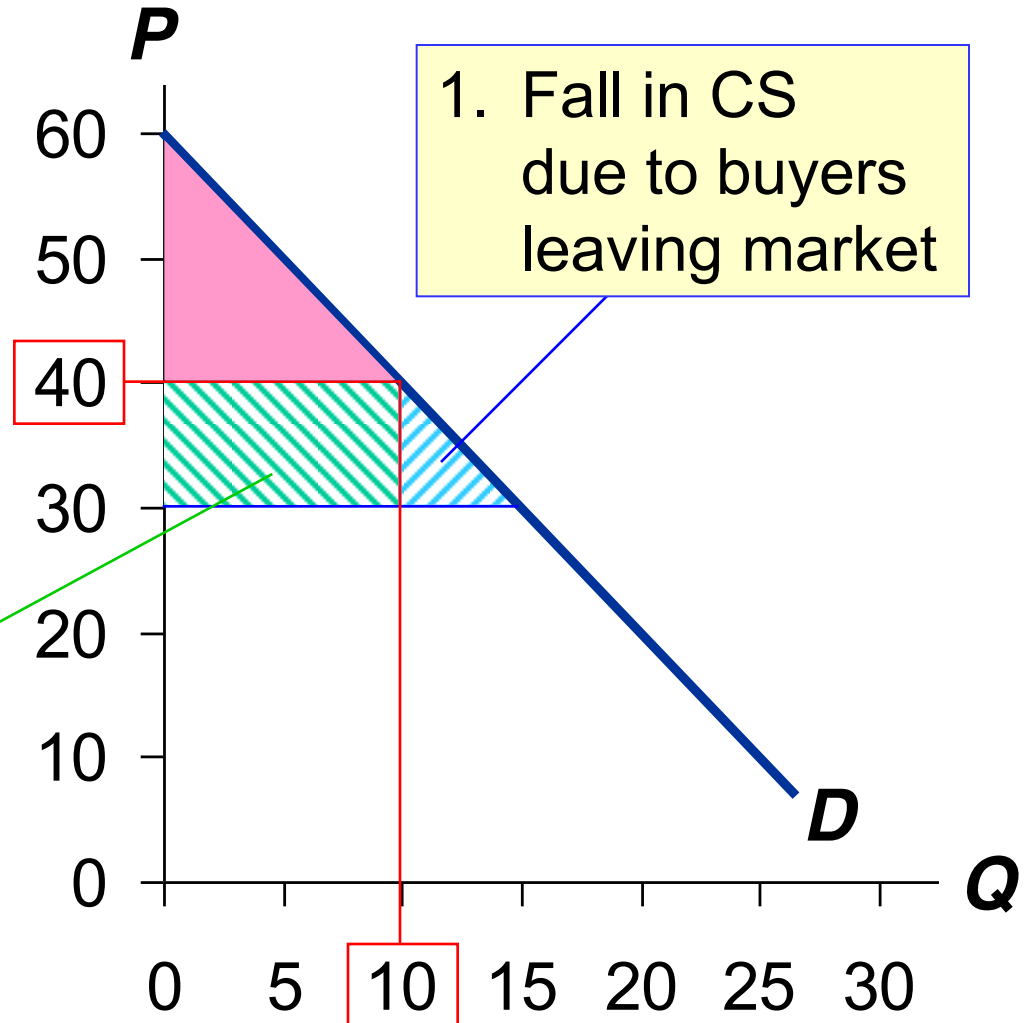


How a Higher Price Reduces CS

If P rises to \$40,

$$\begin{aligned} CS &= \frac{1}{2} \times 10 \times \$20 \\ &= \$100. \end{aligned}$$

Two reasons for the fall in CS.



Cost and the Supply Curve

- **Cost** is the value of everything a seller must give up to produce a good (i.e., opportunity cost).
- Includes cost of all resources used to produce good, including value of the seller's time.
- Example: Costs of 3 sellers in the lawn-cutting business.

<i>name</i>	<i>cost</i>
Jack	\$10
Janet	20
Chrissy	35

A seller will produce and sell the good/service only if the price exceeds his or her cost.

Hence, cost is a measure of willingness to sell.

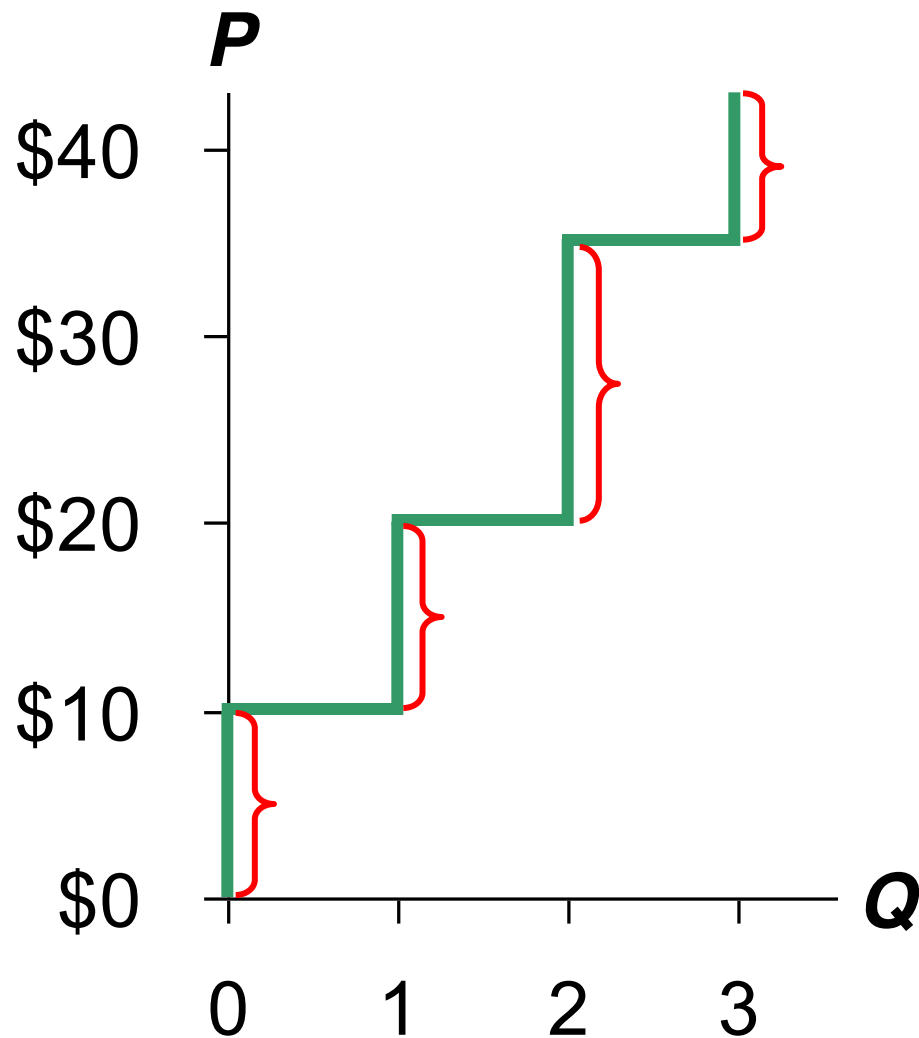
Cost and the Supply Curve

Derive the supply schedule from the cost data:

<i>name</i>	<i>cost</i>
Jack	\$10
Janet	20
Chrissy	35

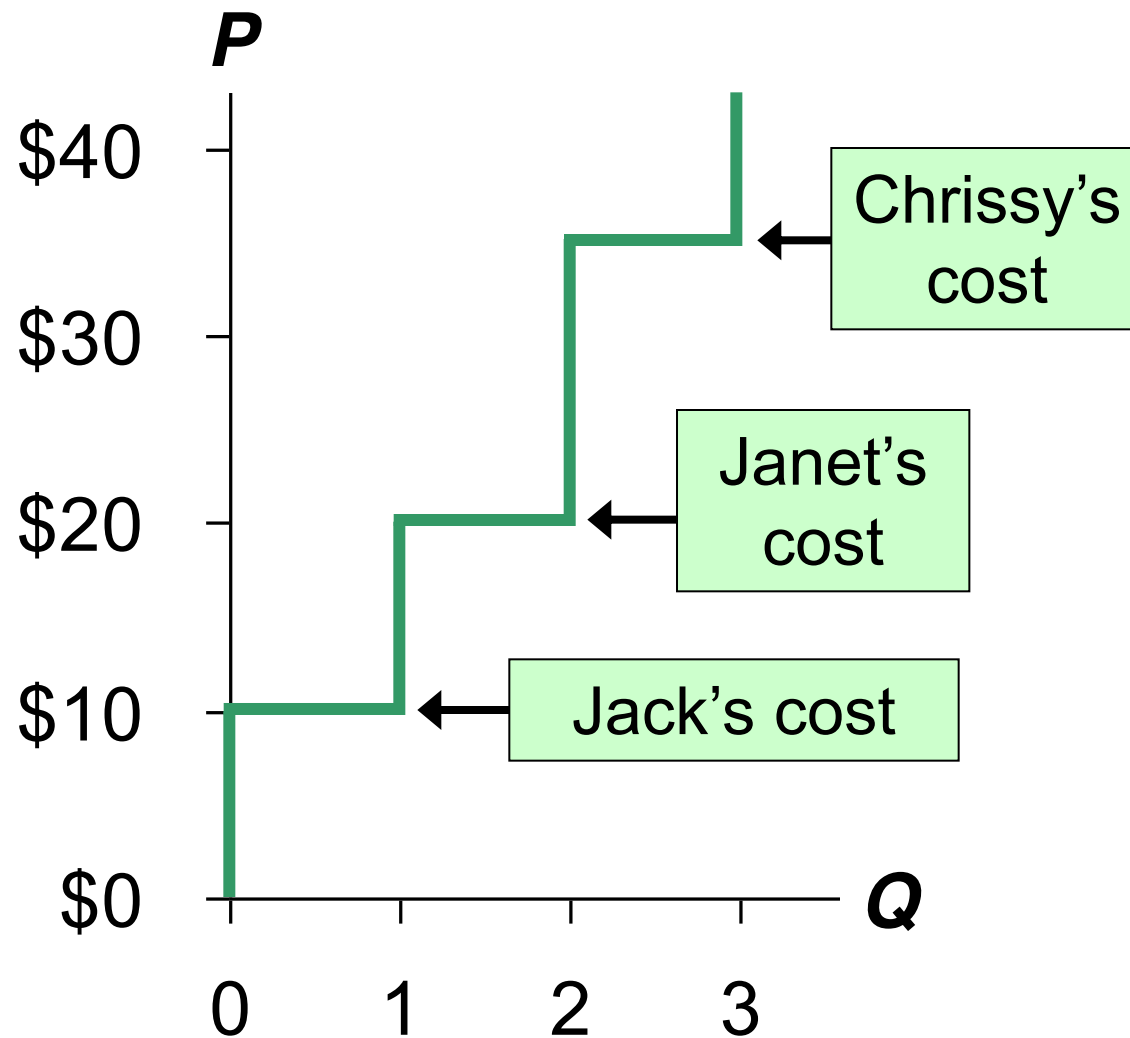
<i>P</i>	<i>Q^s</i>
\$0 – 9	0
10 – 19	1
20 – 34	2
35 & up	3

Cost and the Supply Curve



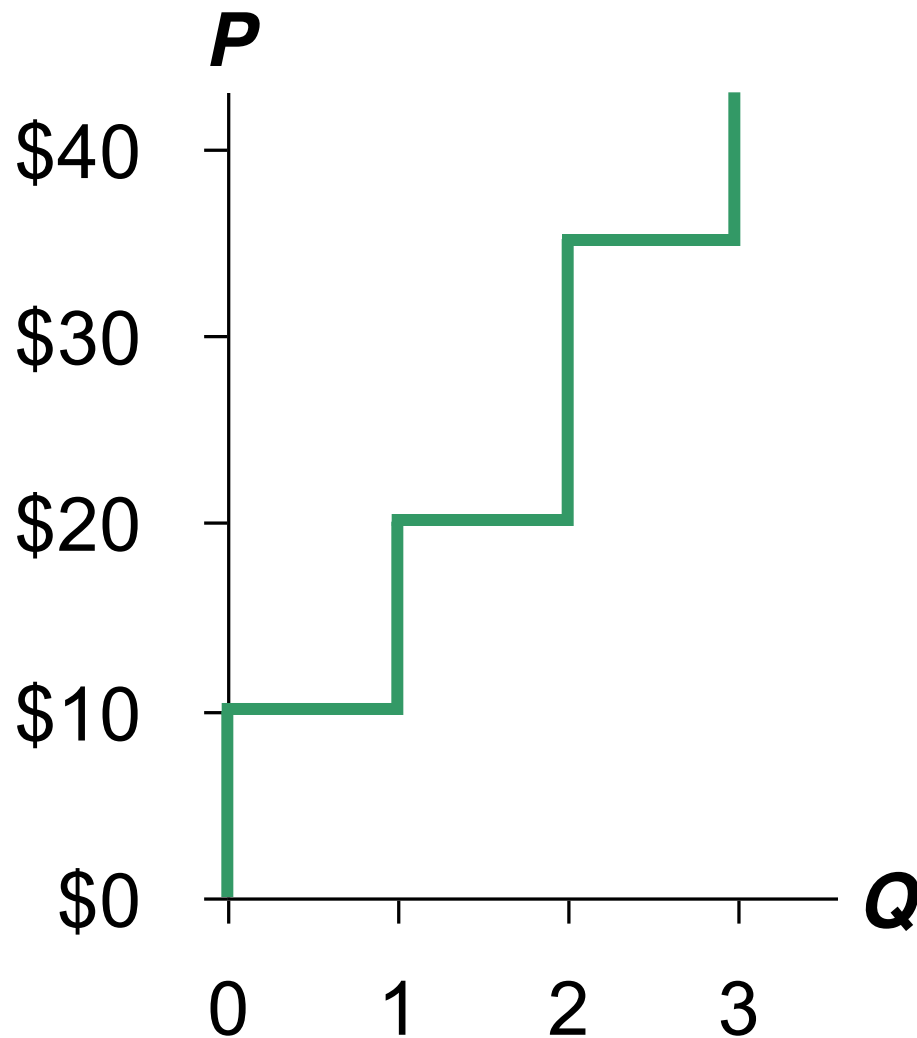
P	Q^s
\$0 – 9	0
10 – 19	1
20 – 34	2
35 & up	3

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.

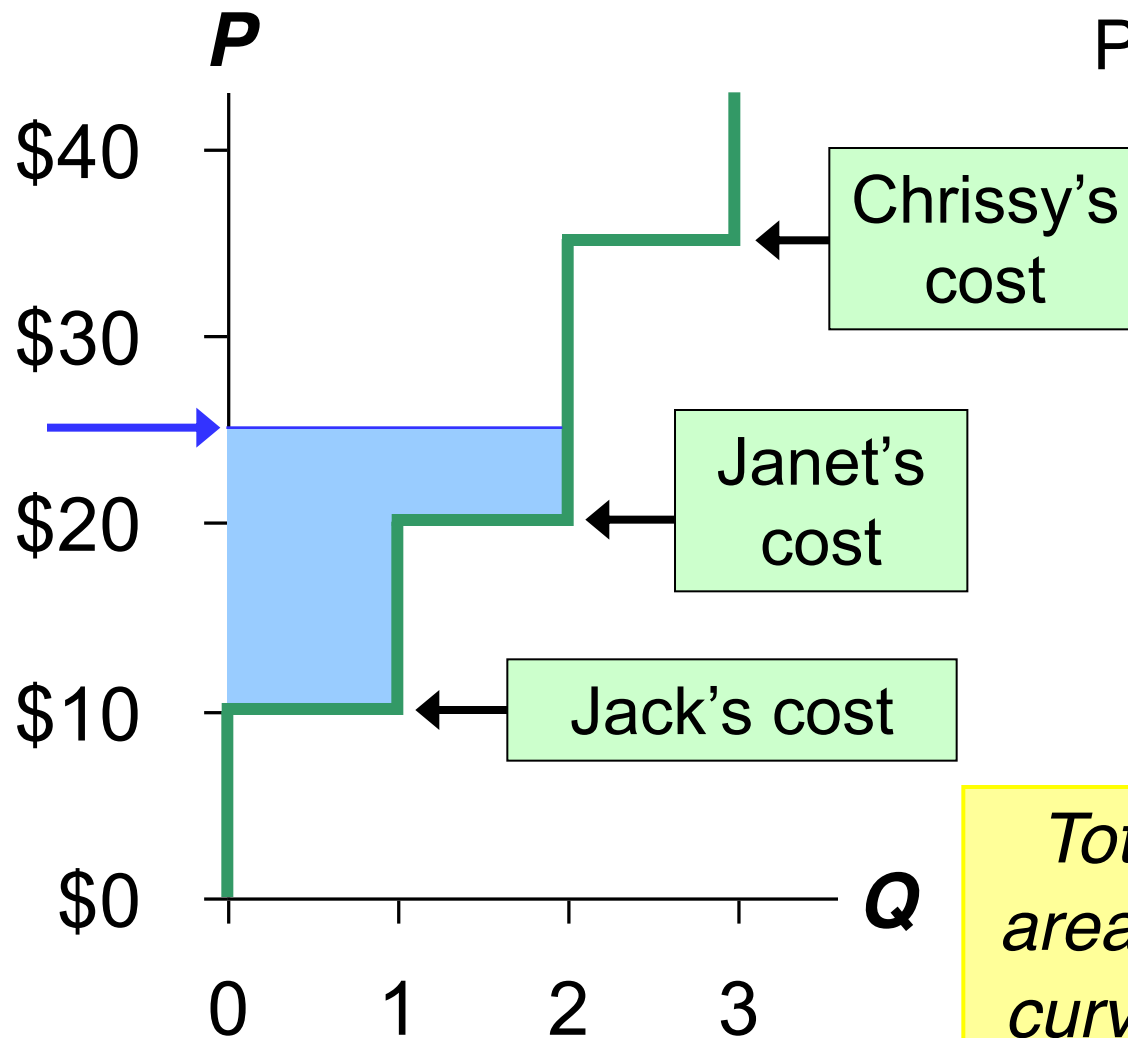
Producer Surplus



$$PS = P - \text{cost}$$

Producer surplus (PS):
the amount a seller
is paid for a good
minus the seller's cost

Producer Surplus and the S Curve



$$PS = P - \text{cost}$$

Suppose $P = \$25$.

Jack's PS = \$15

Janet's PS = \$5

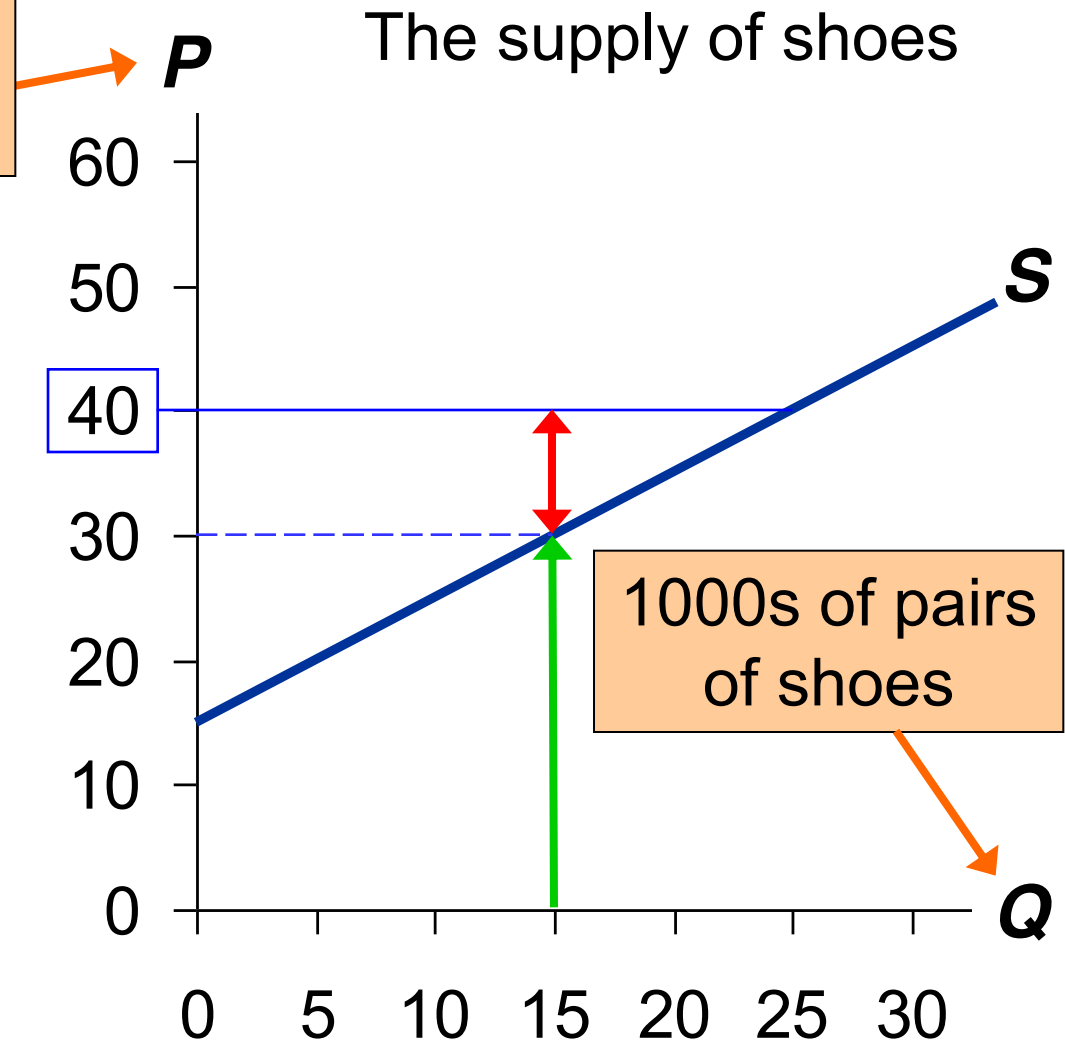
Chrissy's PS = \$0

Total PS = \$20

Total PS equals the area above the supply curve under the price, from 0 to Q .

PS with Lots of Sellers & a Smooth S Curve

Suppose $P = \$40$
At $Q = 15$ (thousand),
the marginal seller's
cost is \$30,
and her producer
surplus is \$10.



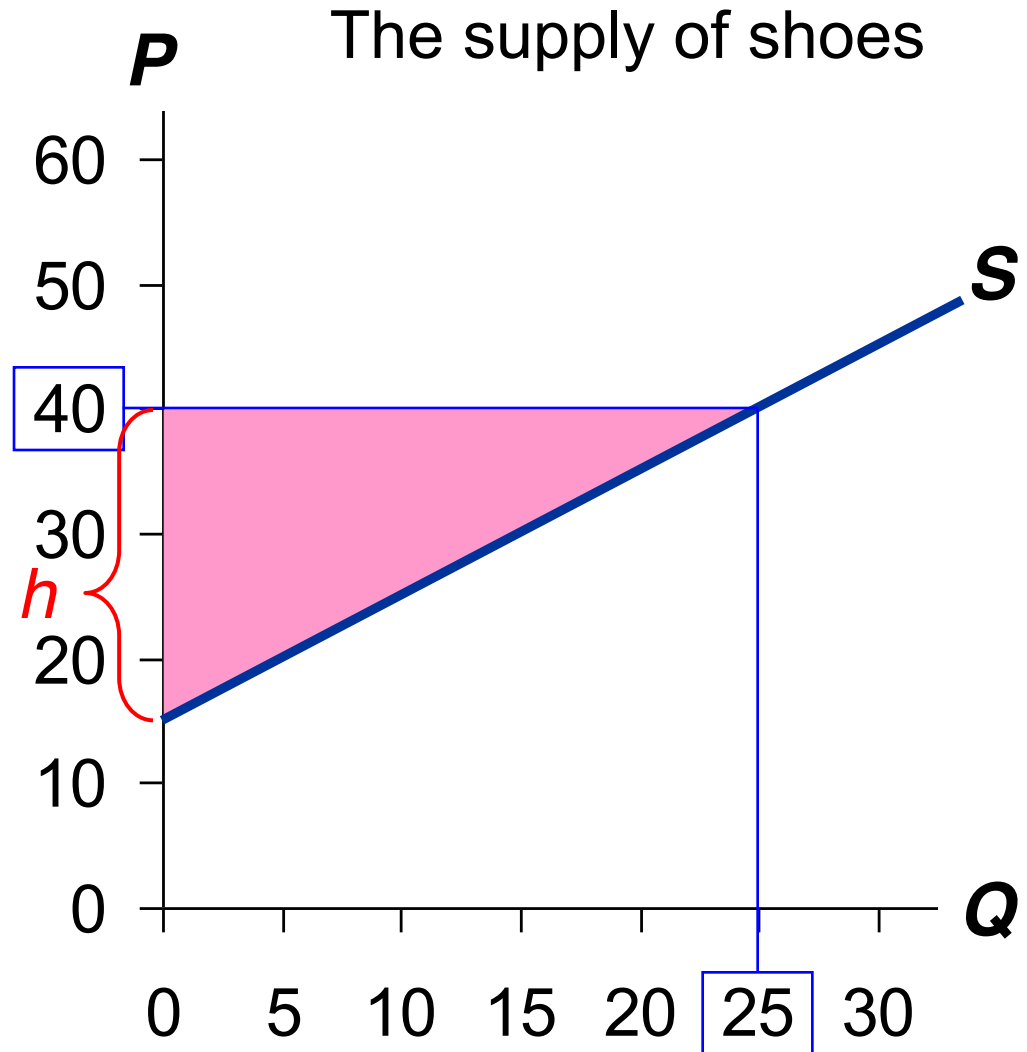
PS with Lots of Sellers & a Smooth S Curve

PS is the area b/w
P and the **S** curve,
from 0 to **Q**.

The height of this
triangle is
 $\$40 - 15 = \25 .

So,

$$\begin{aligned} \text{PS} &= \frac{1}{2} \times b \times h \\ &= \frac{1}{2} \times 25 \times \$25 \\ &= \underline{\underline{\$312.50}} \end{aligned}$$



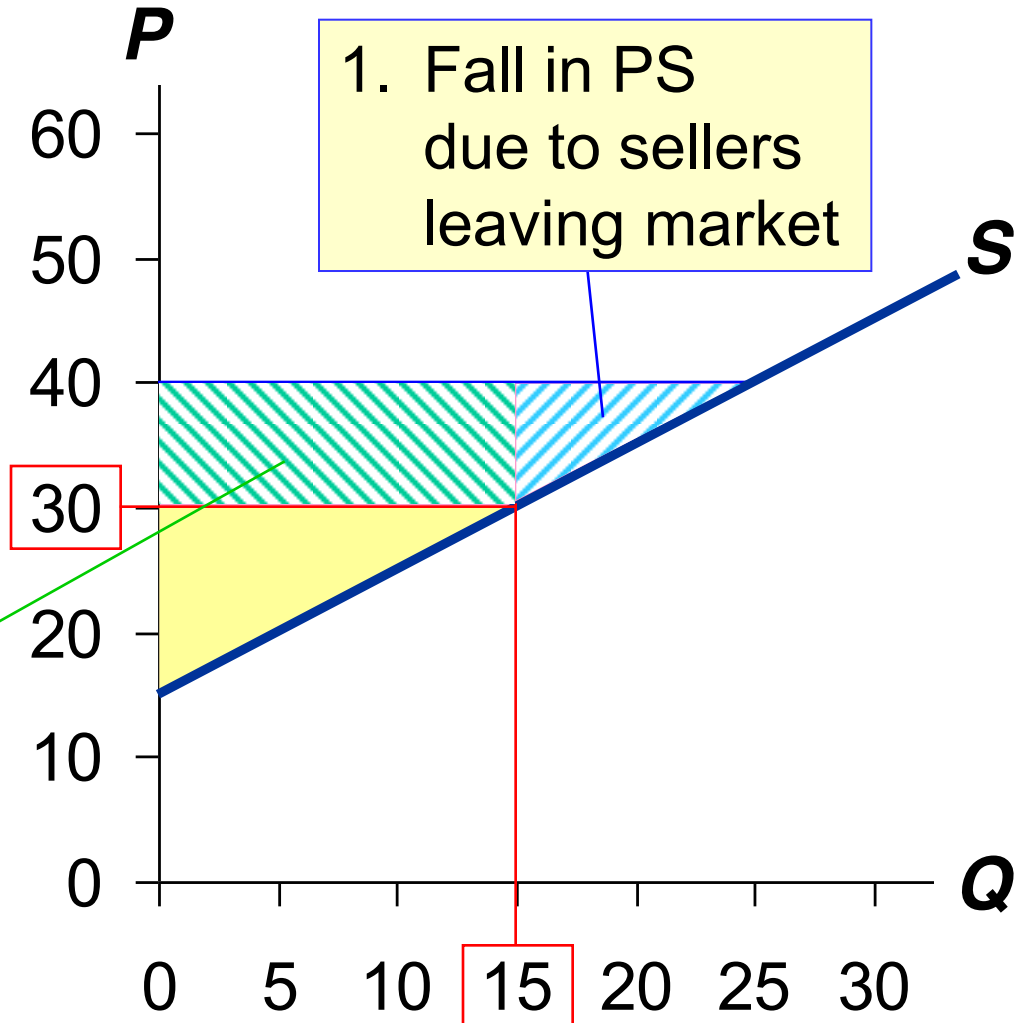
How a Lower Price Reduces PS

If P falls to \$30,

$$\begin{aligned} PS &= \frac{1}{2} \times 15 \times \$15 \\ &= \underline{\underline{\$112.50}} \end{aligned}$$

Two reasons for the fall in PS.

2. Fall in PS due to remaining sellers getting lower P



CS, PS, and Total Surplus

CS = (value to buyers) – (amount paid by buyers)
= buyers' gains from participating in the market

PS = (amount received by sellers) – (cost to sellers)
= sellers' gains from participating in the market

Total surplus = CS + PS
= total gains from trade in a market
= (value to buyers) – (cost to sellers)

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*.
(Policymakers also care about *equality*, though our focus here is on efficiency.)

Efficiency

$$\text{Total surplus} = (\text{value to buyers}) - (\text{cost to sellers})$$

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 producers with the lowest costs.
- Raising or lowering the quantity of a good would not increase total surplus.

Evaluating the Market Equilibrium

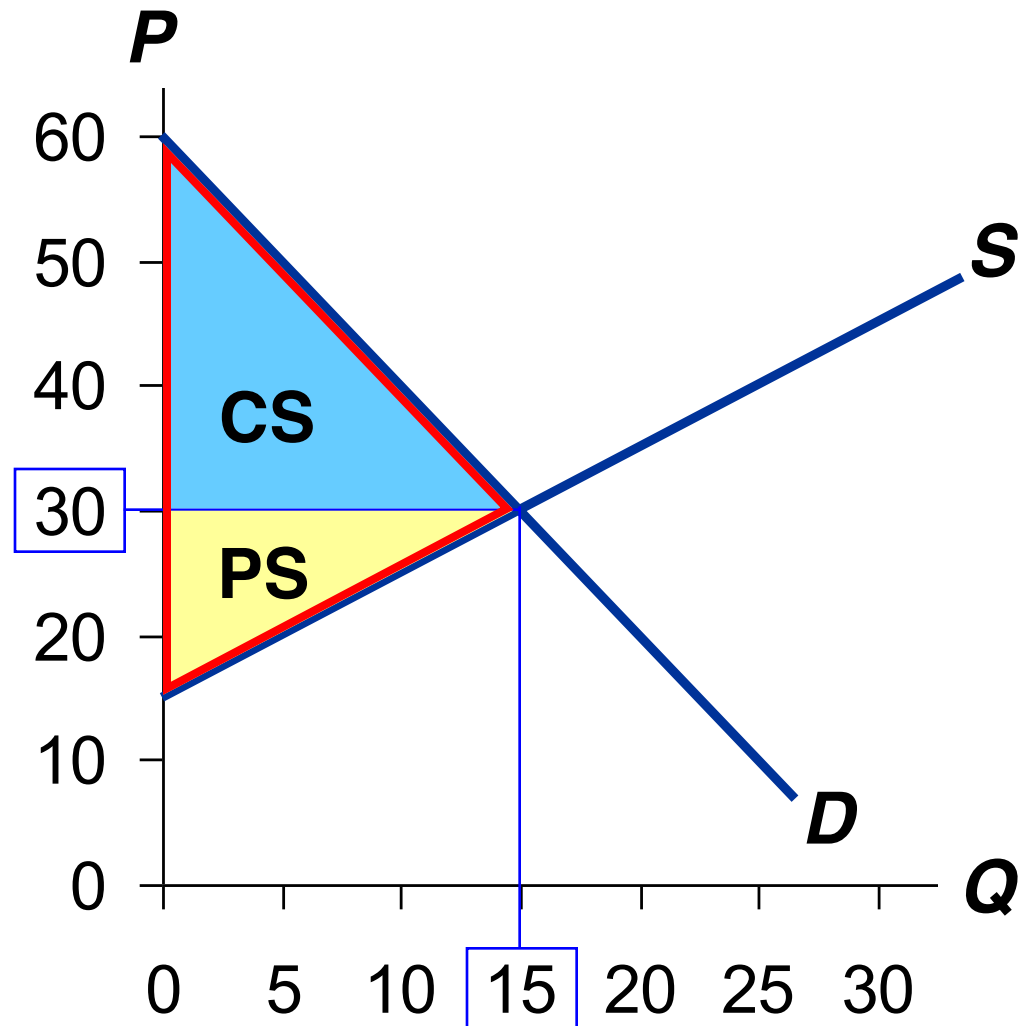
Market eq'm:

$$P = \$30$$

$$Q = 15,000$$

Total surplus
= CS + PS

Is the market eq'm
efficient?

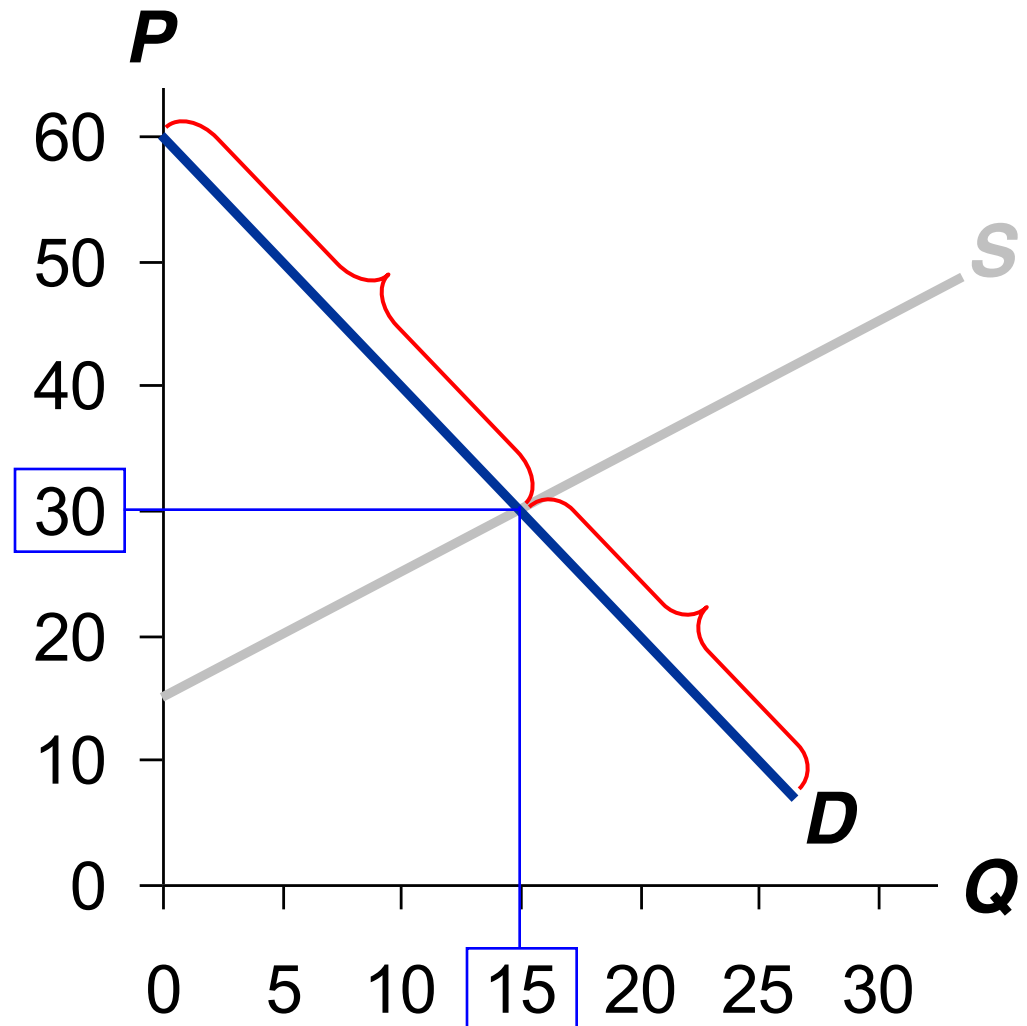


Which Buyers Consume the Good?

Every buyer whose WTP is $\geq \$30$ will buy.

Every buyer whose WTP is $< \$30$ will not.

So, ***the buyers who value the good most highly are the ones who consume it.***

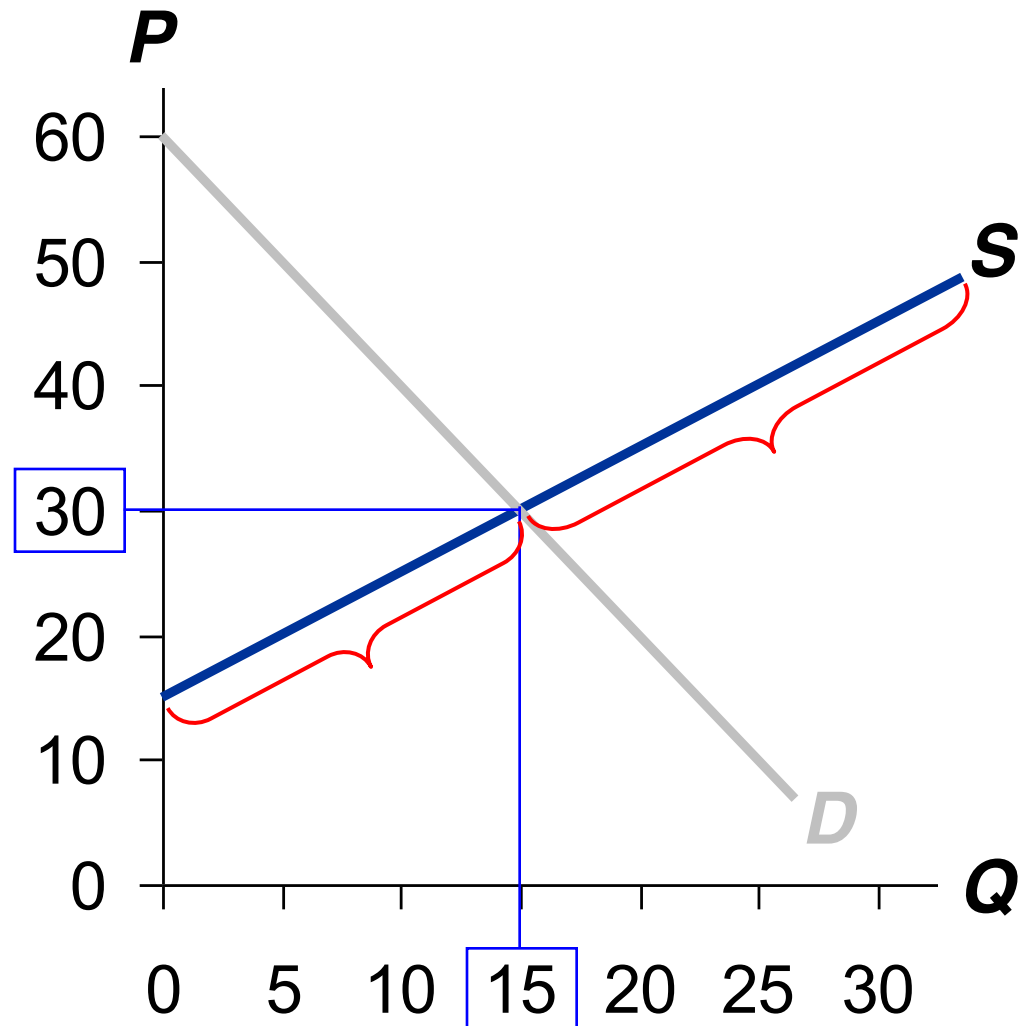


Which Sellers Produce the Good?

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

Every seller whose cost is $> \$30$ will not.

So, ***the sellers with the lowest cost produce the good.***



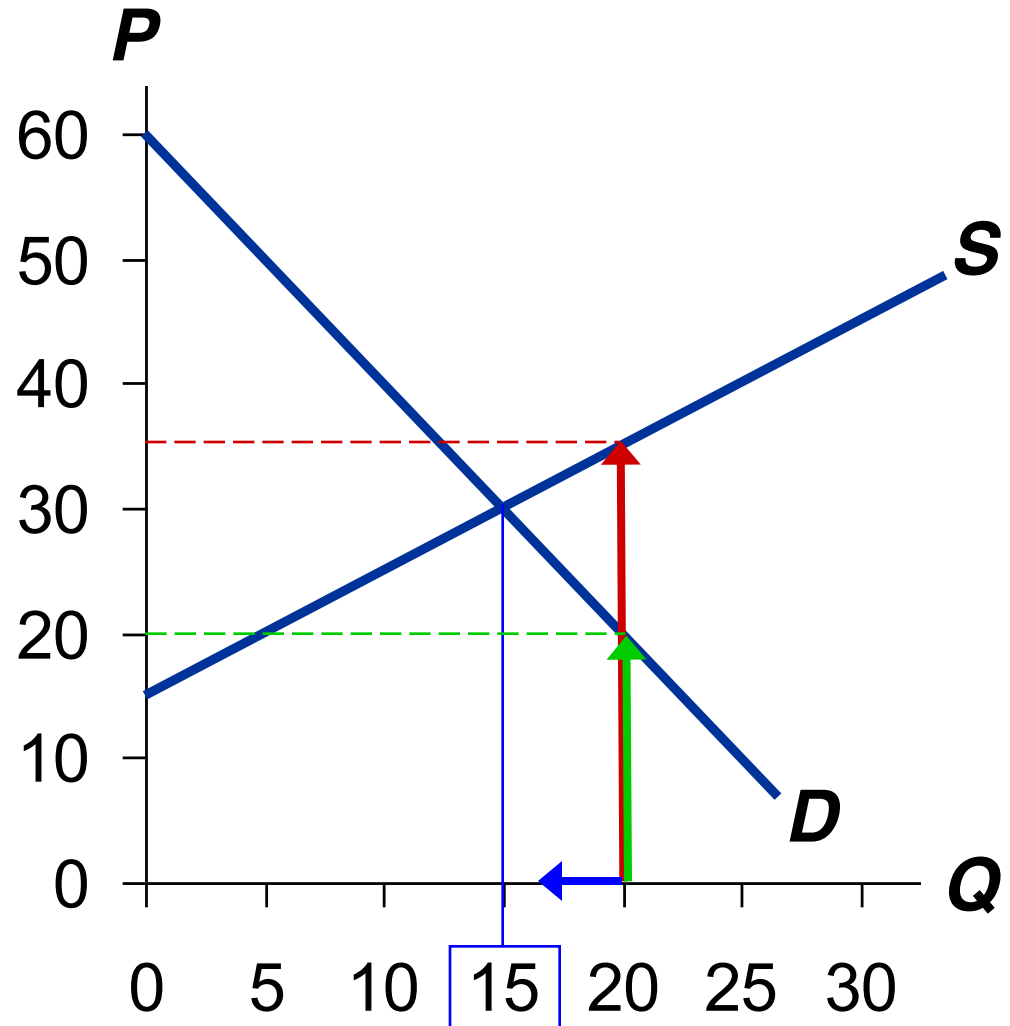
Does Eq'm Q Maximize Total Surplus?

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

value to consumers
of the marginal unit
is only \$20

Hence, can increase
total surplus
by reducing Q .

*This is true at any Q
greater than 15.*



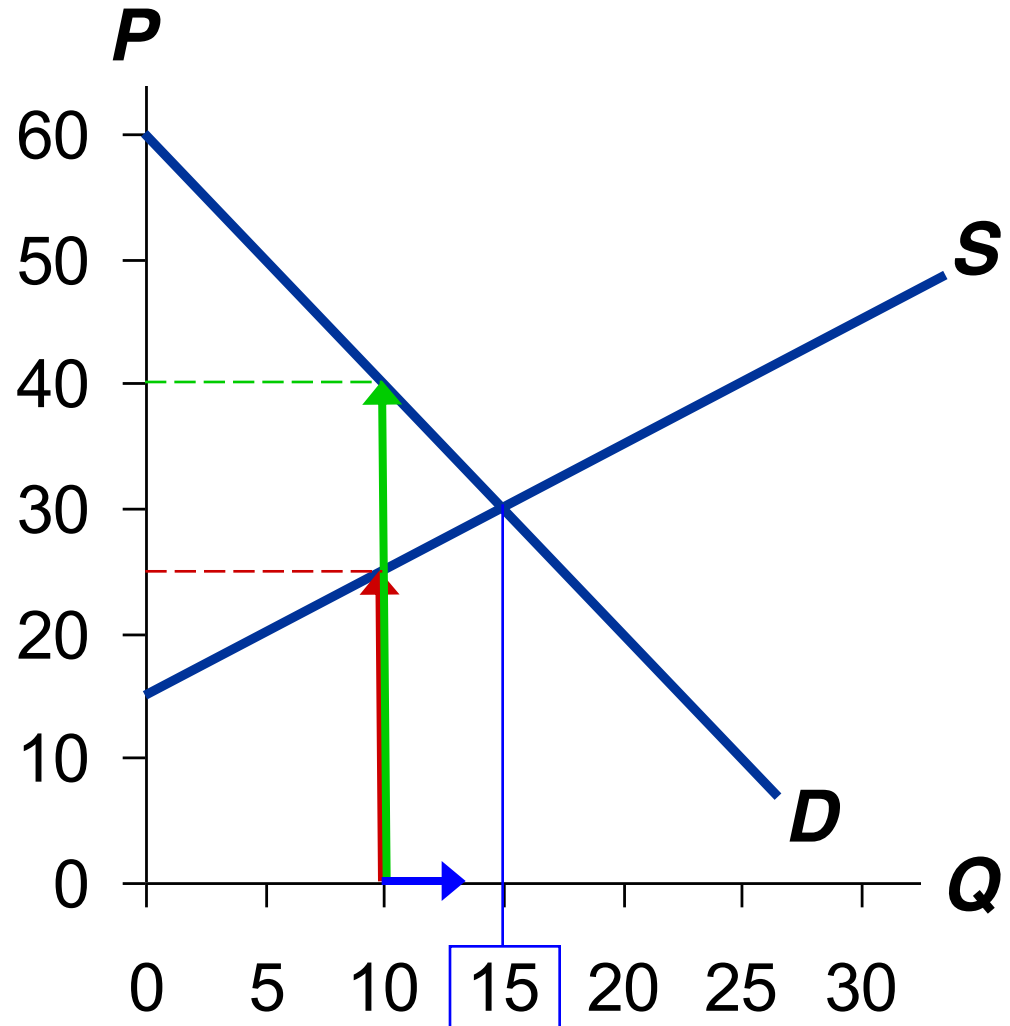
Does Eq'm Q Maximize Total Surplus?

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

value to consumers
of the marginal unit
is \$40

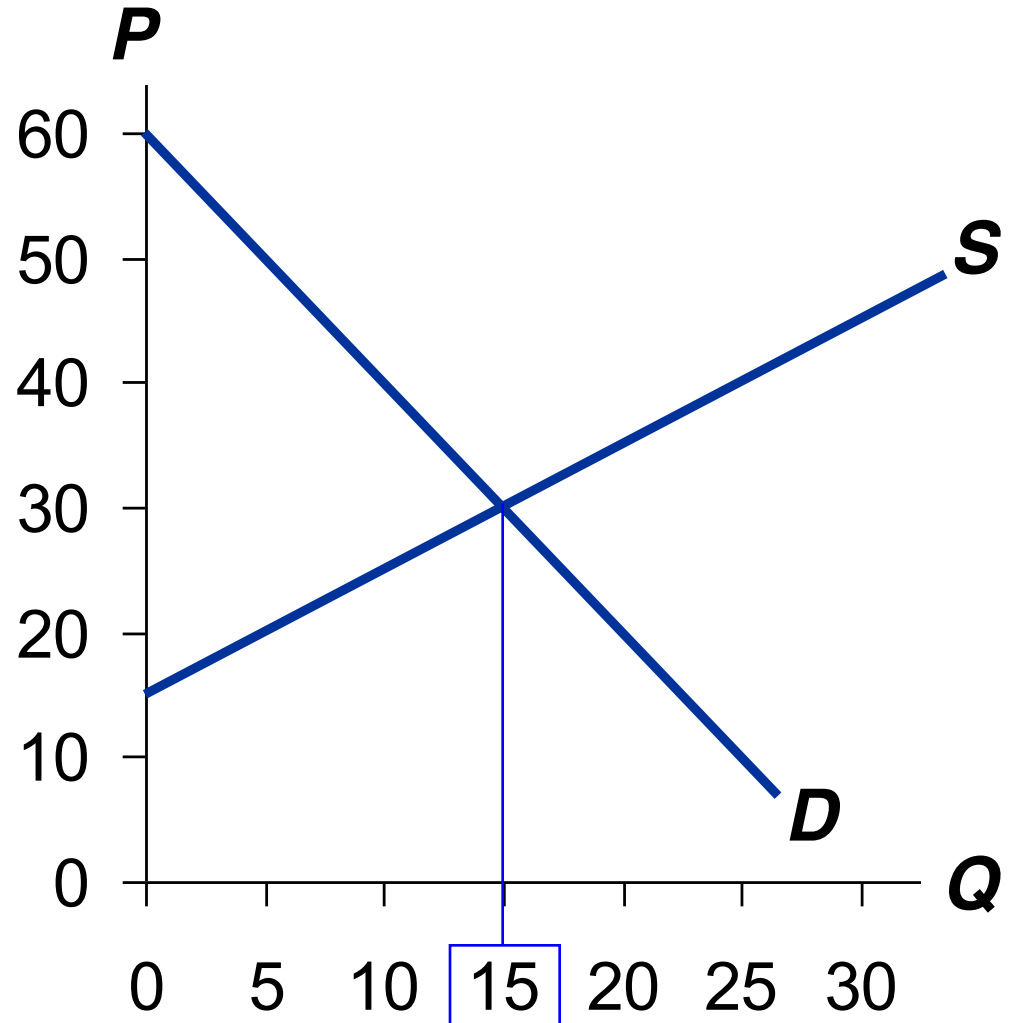
Hence, can increase
total surplus
by increasing Q .

*This is true at any Q
less than 15.*



Does Eq'm Q Maximize Total Surplus?

The market eq'm quantity maximizes total surplus: At any other quantity, can increase total surplus by moving toward the market eq'm quantity.



The Free Market vs. Govt Intervention

- The market equilibrium is efficient. No other outcome achieves higher total surplus.
- Govt cannot raise total surplus by changing the market's allocation of resources.
- *Laissez faire* (French for “allow them to do”): the notion that govt should not interfere with the market.

SUMMARY

- The height of the ***D*** curve reflects the value of the good to buyers—their willingness to pay for it.
- Consumer surplus is the difference between what buyers are willing to pay for a good and what they actually pay.
- On the graph, consumer surplus is the area between ***P*** and the ***D*** curve.

SUMMARY

- The height of the **S** curve is sellers' cost of producing the good. Sellers are willing to sell if the price they get is at least as high as their cost.
- Producer surplus is the difference between what sellers receive for a good and their cost of producing it.
- On the graph, producer surplus is the area between **P** and the **S** curve.

SUMMARY

- To measure society's well-being, we use total surplus, the sum of consumer and producer surplus.
- Efficiency means that total surplus is maximized, that the goods are produced by sellers with lowest cost, and that they are consumed by buyers who most value them.
- Under perfect competition, the market outcome is efficient. Altering it would reduce total surplus.