Economics 1
Principles of Economics

Consumers, Producers, and the Efficiency of Markets (Chapter 7)

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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?

I. 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.

Name	*WTP*
Anthony	$250
Chad	$175
Flea	$300
John	$125

Example:
4 buyers' WTP for an iPod

II. WTP and the Demand Curve

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

Name	*WTP*
Anthony	$250
Chad	$175
Flea	$300
John	$125

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

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

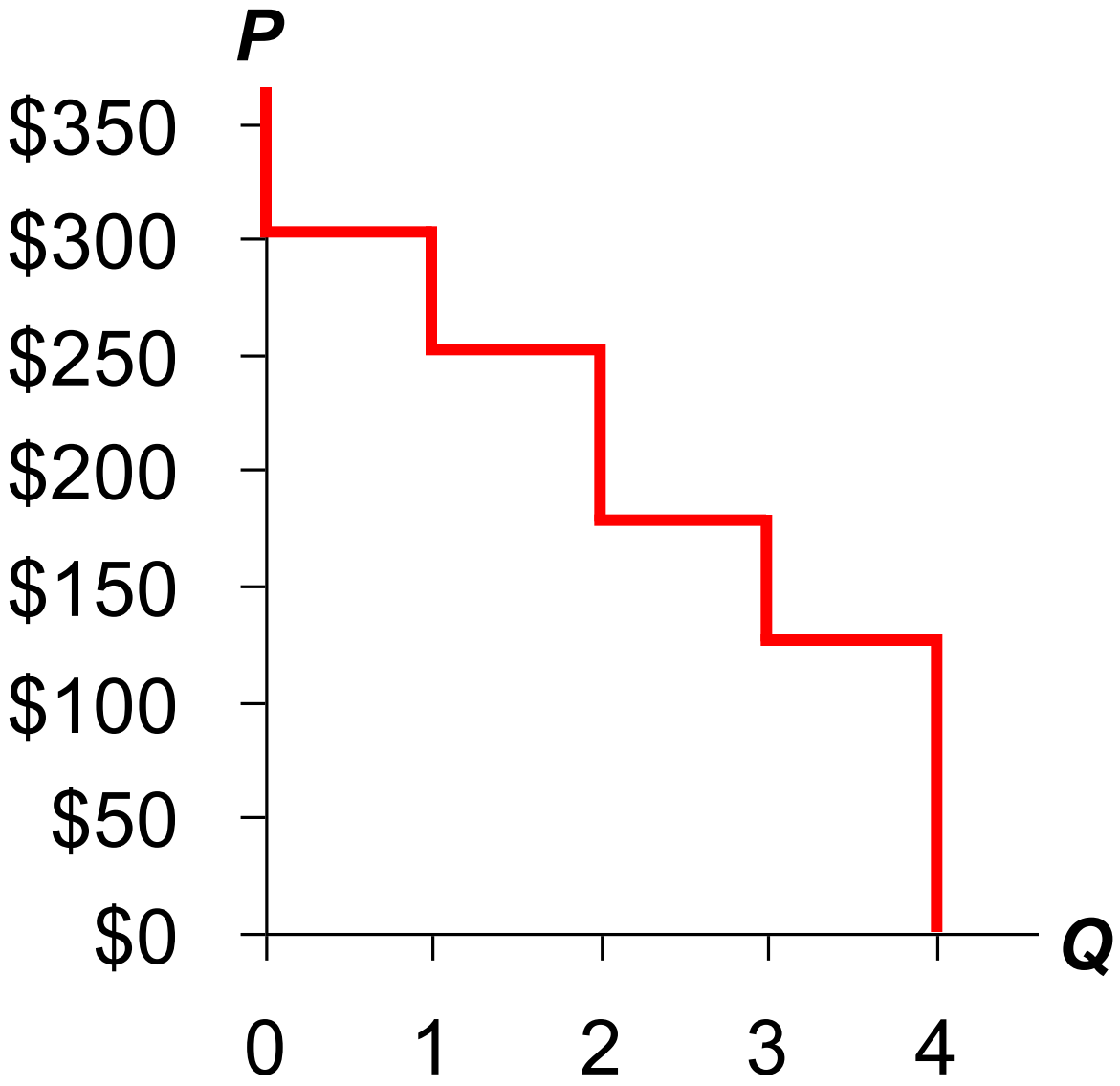
II. WTP and the Demand Curve 2 of 4

Derive the demand schedule:

Name	*WTP*
Anthony	$250
Chad	$175
Flea	$300
John	$125

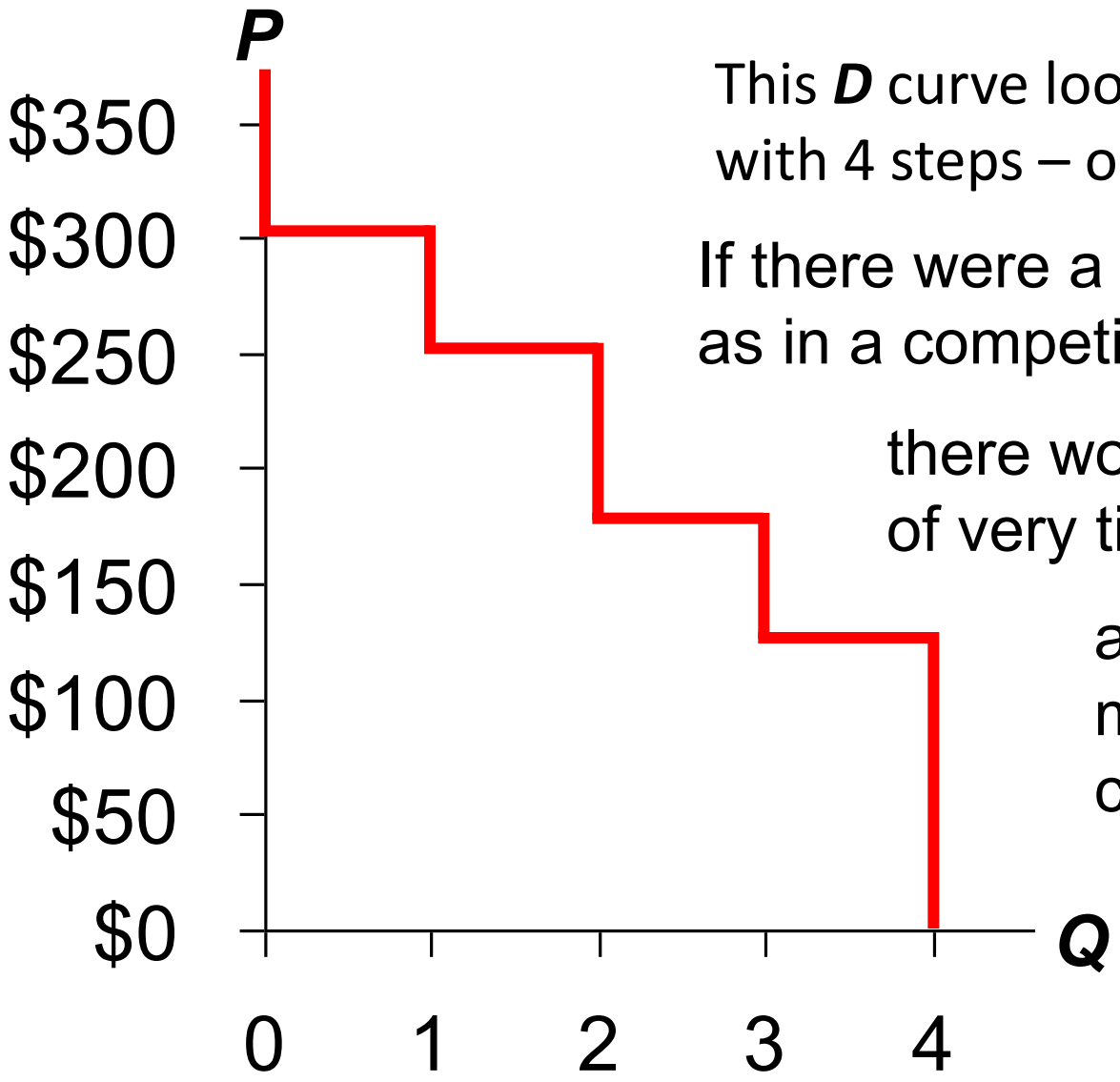
P (price of iPod)	Who buys it	Q_D
$301 & up	nobody	0
251 – 300	Flea	1
176 – 250	Anthony, Flea	2
126 – 175	Chad, Anthony, Flea	3
0 – 125	John, Chad, Anthony, Flea	4

II. 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…



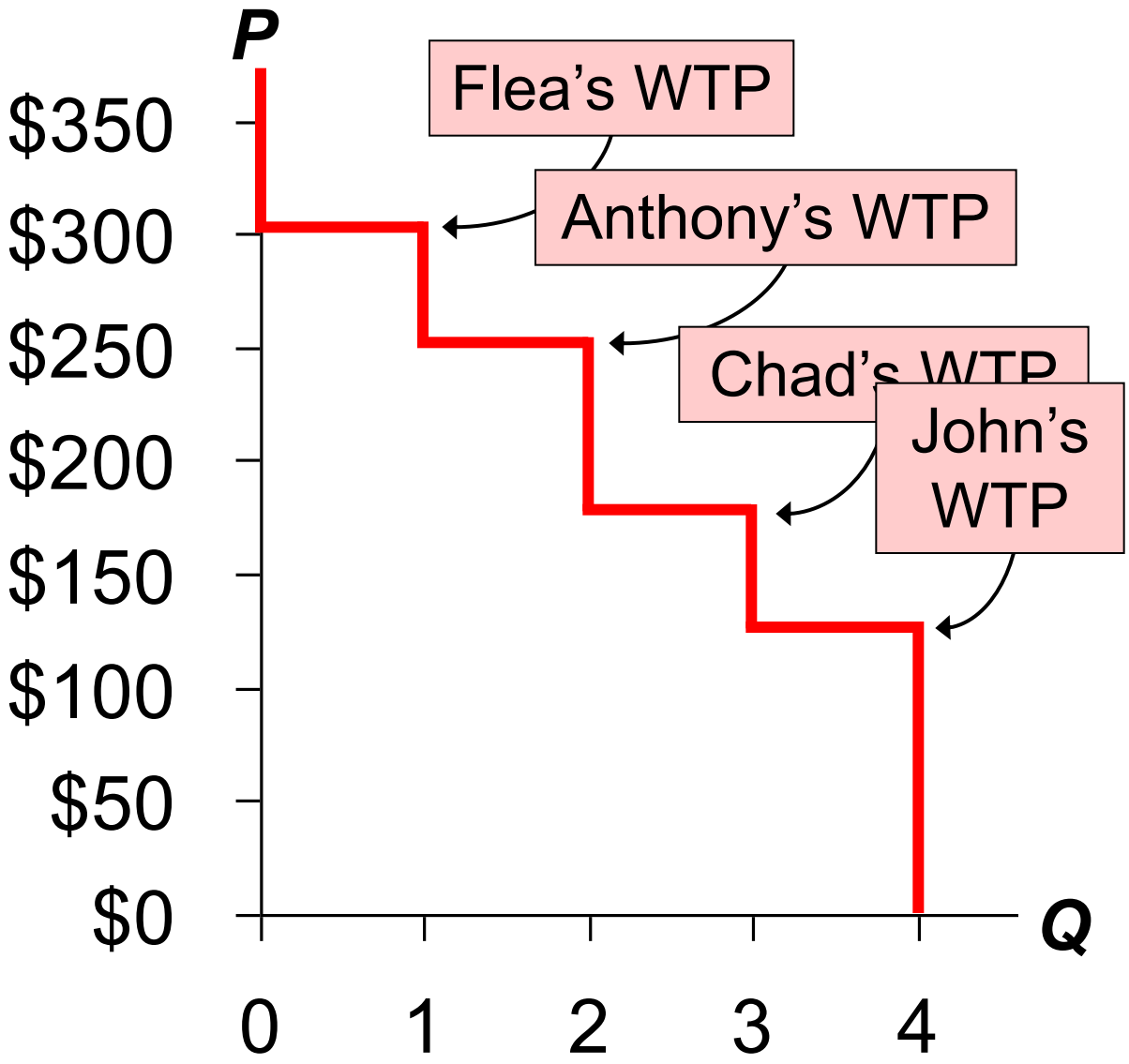
This ***D*** curve looks like a staircase with 4 steps – one per buyer.

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

there would be a huge # of very tiny steps,

and it would look more like a smooth curve.

II. 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:

$$CS = WTP - P$$

Name	*WTP*
Anthony	$250
Chad	$175
Flea	$300
John	$125

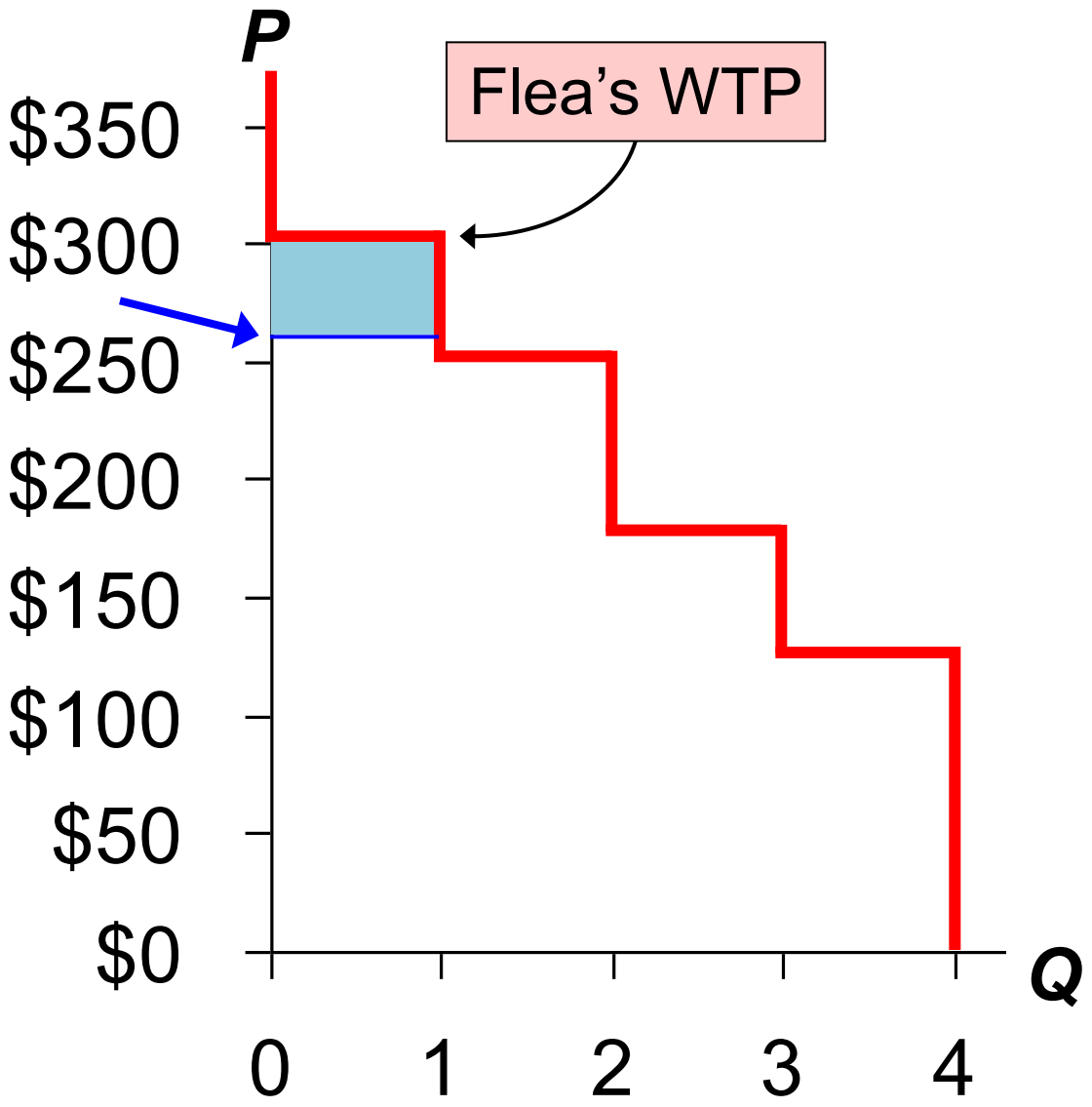
Suppose ***P*** = $260.

Flea's CS = $300 – 260 = $40.

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

Total CS = $40.

III. CS and the Demand Curve

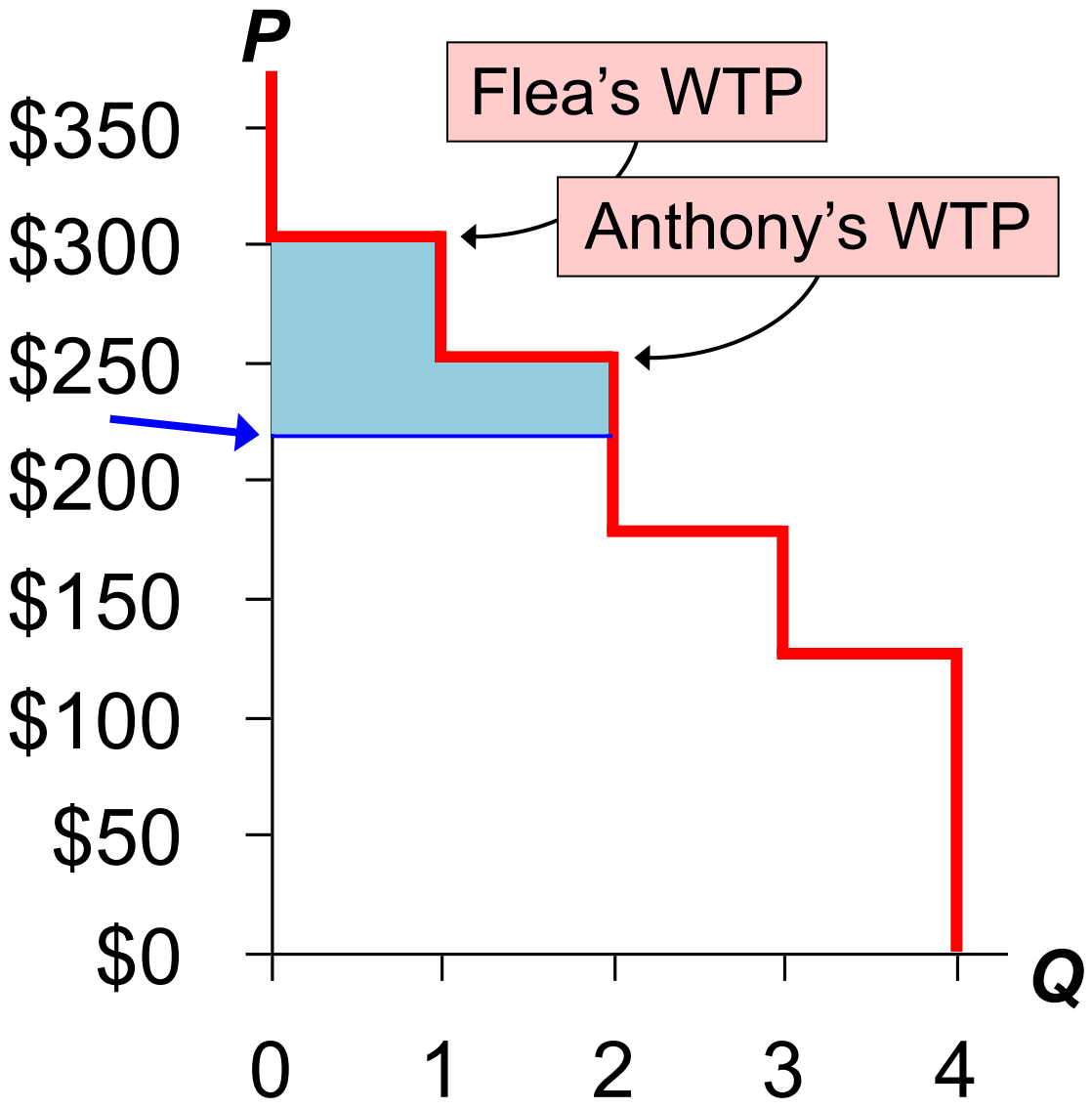


P = $260

Flea's CS =
$300 – 260 = $40

Total CS = $40

III. CS and the Demand Curve 2 of 3



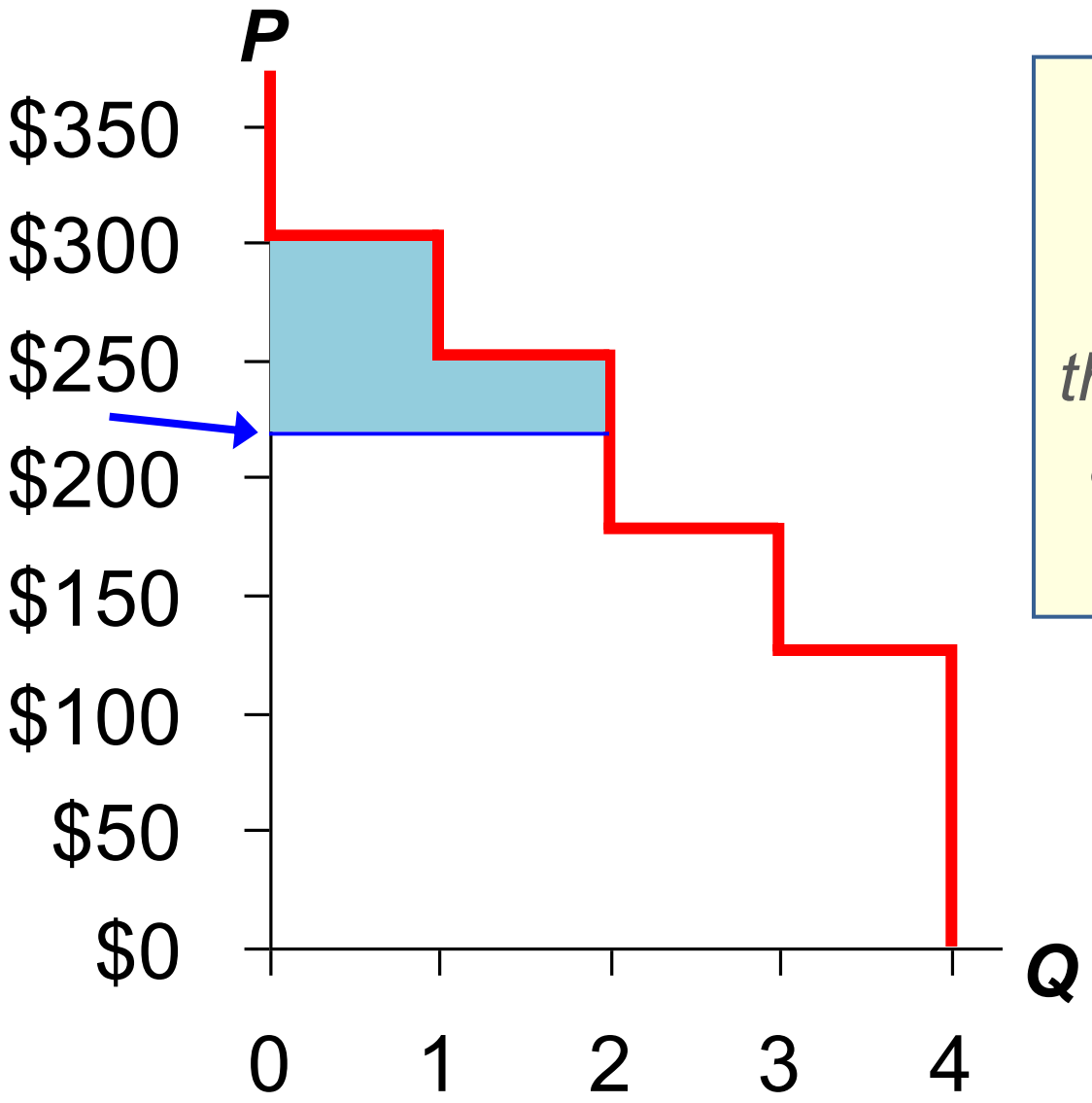
Instead, suppose ***P*** = $220

Flea's CS = $300 – 220 = $80

Anthony's CS = $250 – 220 = $30

Total CS = $110

III. CS and the Demand Curve 3 of 3



The Lesson:

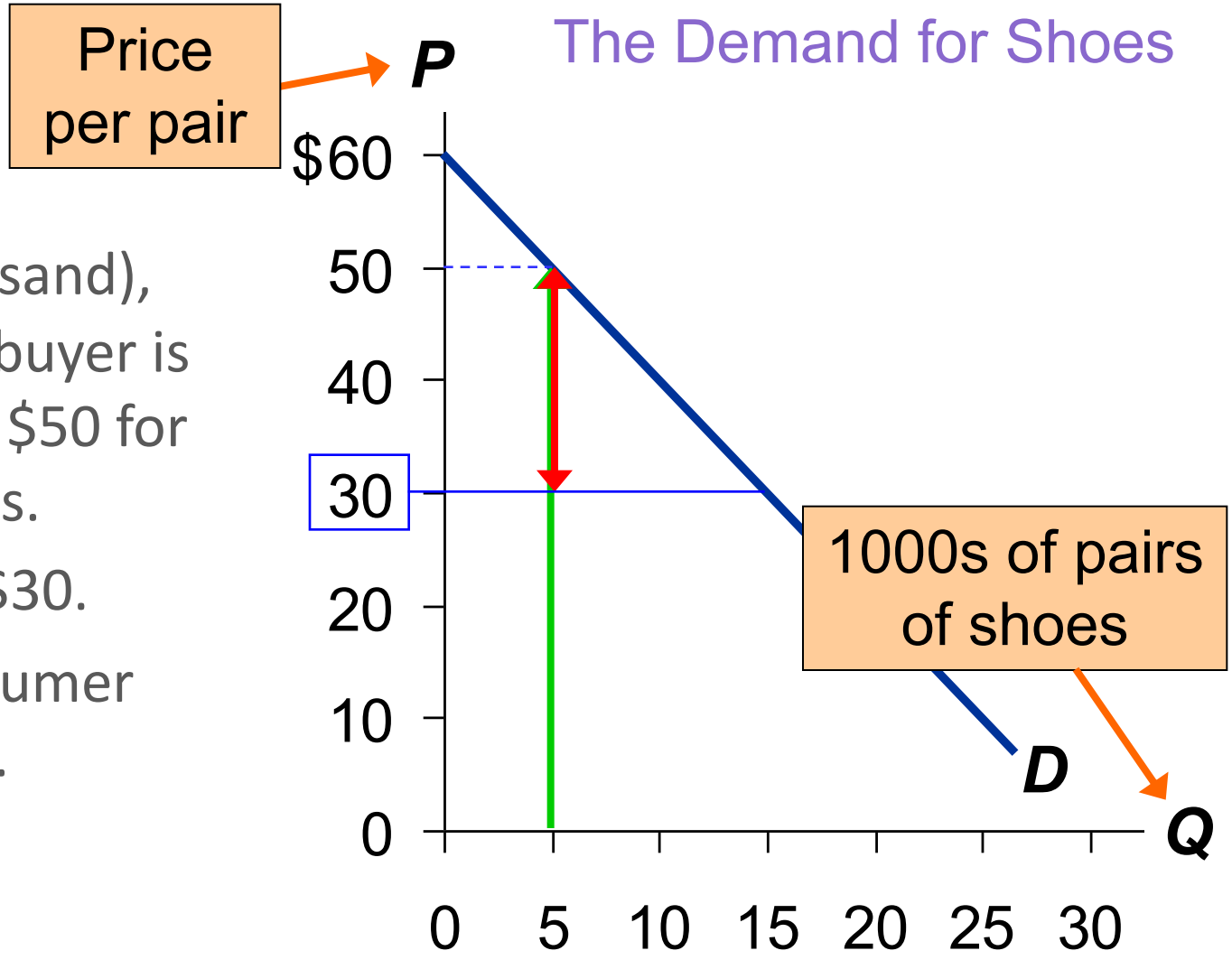
*Total CS equals the area under the demand curve above the price, from 0 to **Q**.*

IV. CS with Lots of Buyers & a Smooth D Curve 1of 2

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

Suppose ***P*** = $30.

Then his consumer surplus = $20.



IV. CS with Lots of Buyers & a Smooth D Curve 2 of 2

CS is the area between ***P*** and the ***D*** curve, from 0 to ***Q***.

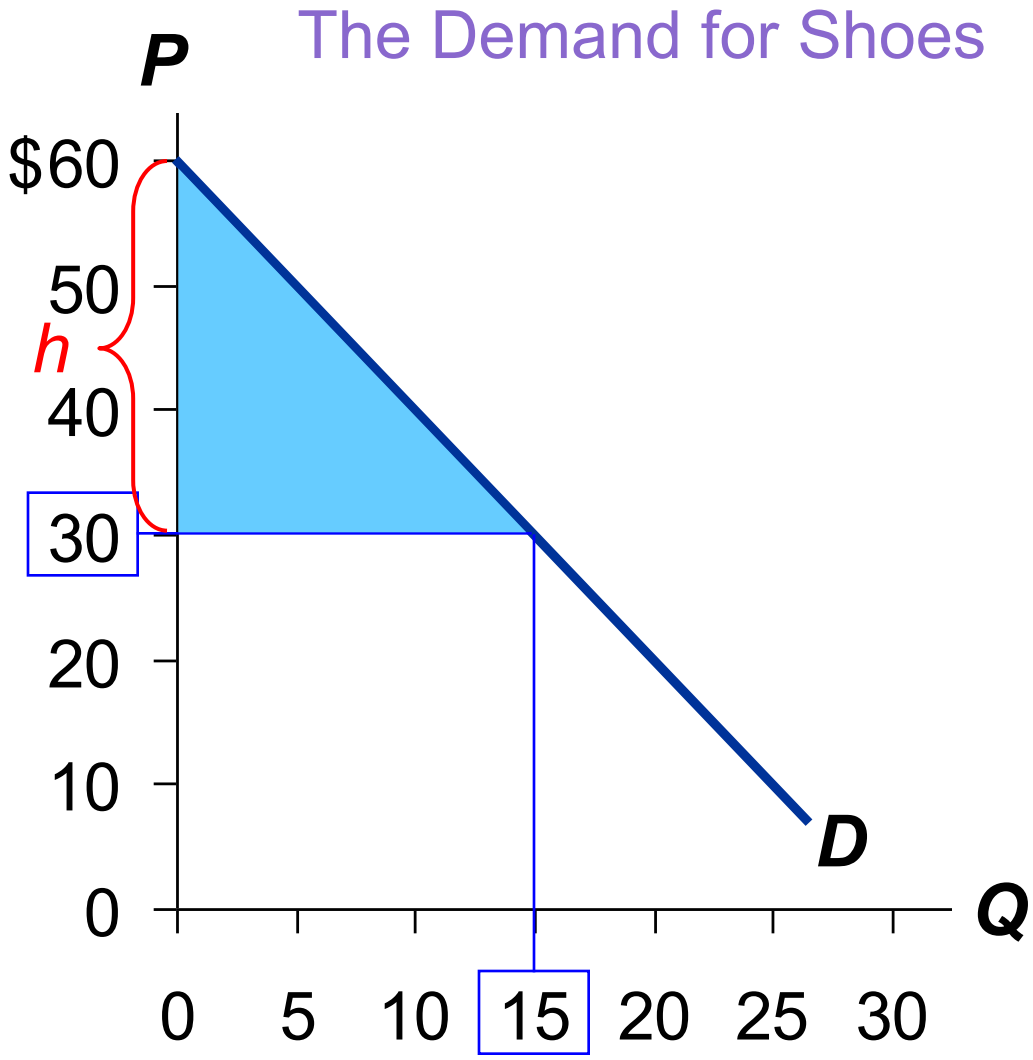
Recall: Area of a triangle equals ½ x base x height

Height = $60 – 30 = $30.

So,

CS = ½ x 15 x $30

= $225.

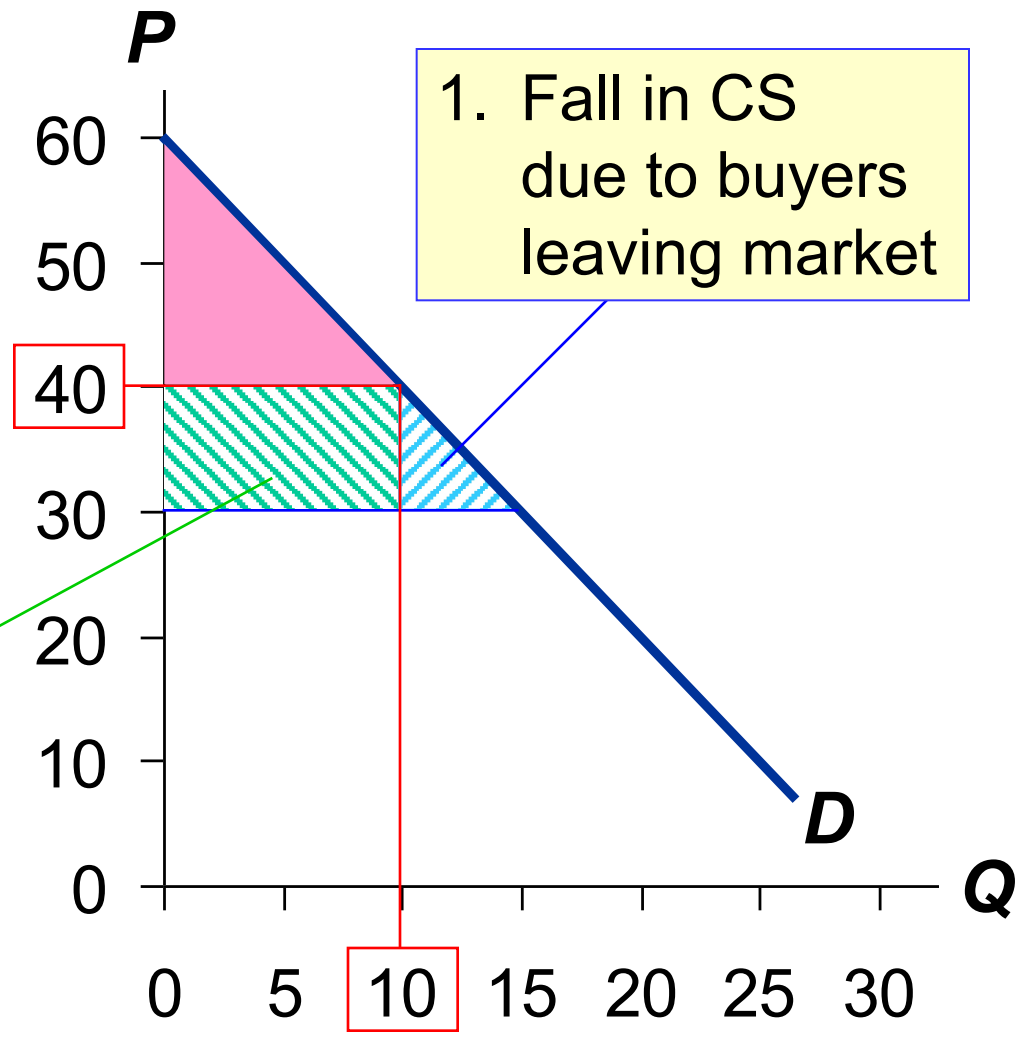


How a Higher Price Reduces CS

If ***P*** rises to \$40,

CS = ½ x 10 x \$20
= \$100.

Two reasons for the fall in CS.



Example: Consumer Surplus

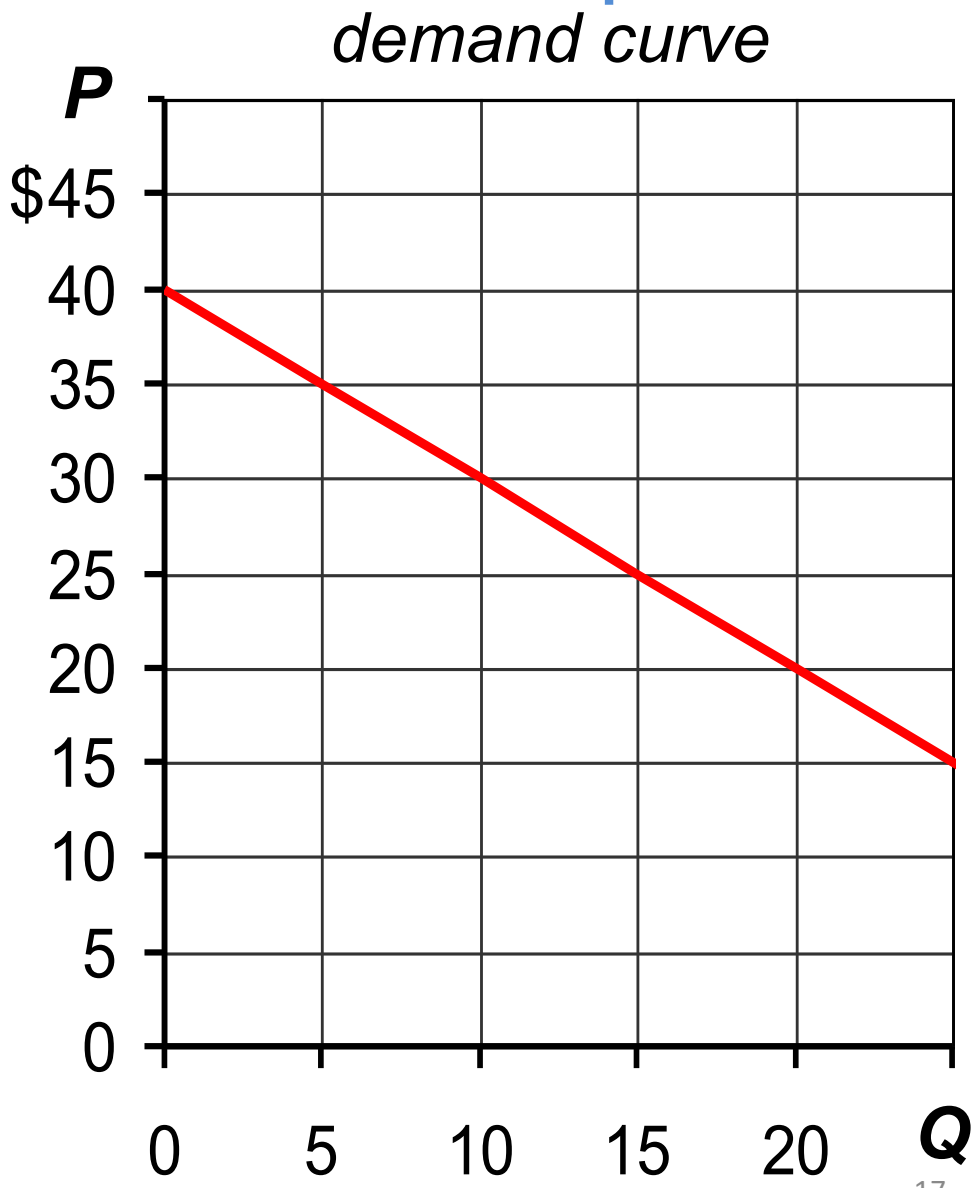
A. Find marginal buyer's WTP at $Q = 10$.

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 lower price



Example: Consumer Surplus

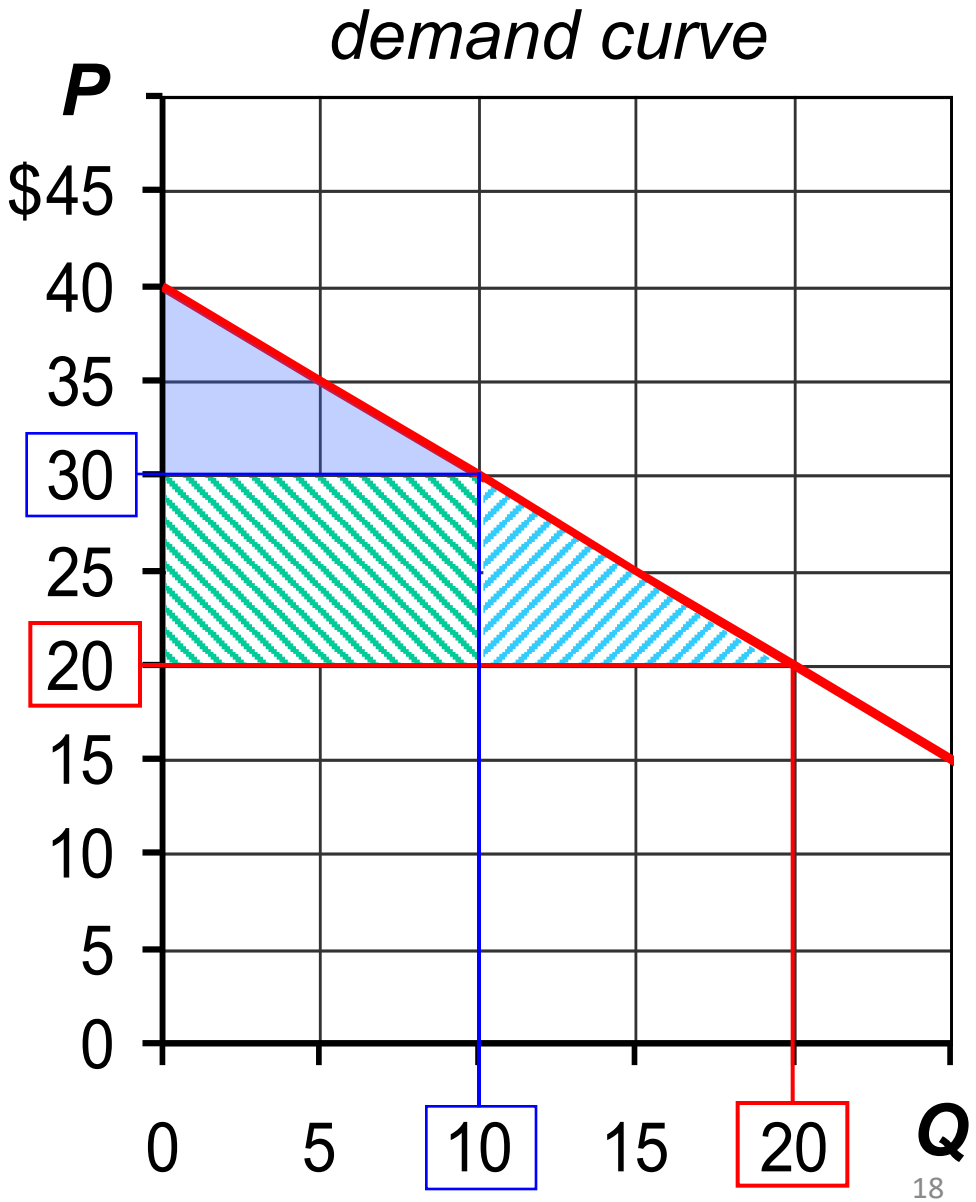
A. At ***Q*** = 10, marginal buyer's WTP is $30.

B. CS = ½ x 10 x $10 = $50

P falls to $20.

C. CS for the additional buyers = ½ x 10 x $10 = $50

D. Increase in CS on initial 10 units = 10 x $10 = $100



V. Cost and the Supply Curve 1 of 4

- 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.

Name	*cost*
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.

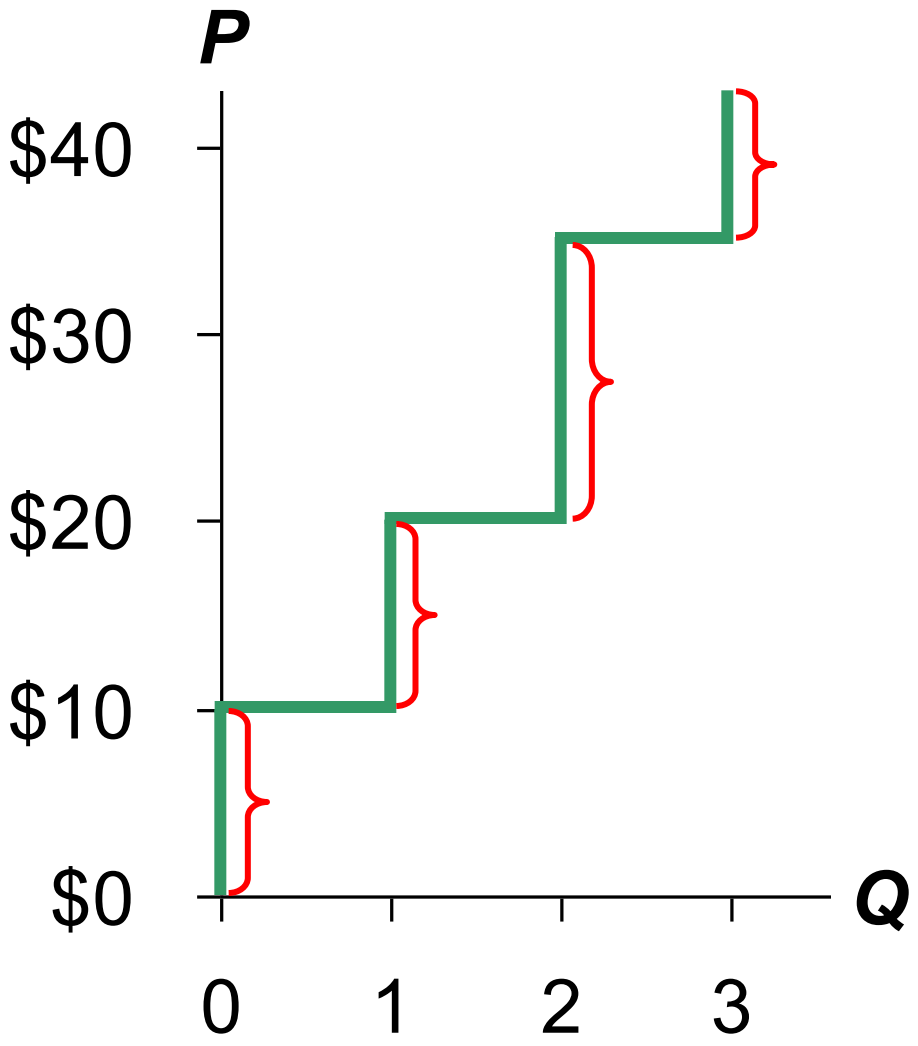
V. Cost and the Supply Curve 2 of 4

Derive the supply schedule from the cost data:

Name	*cost*
Jack	$10
Janet	$20
Chrissy	$35

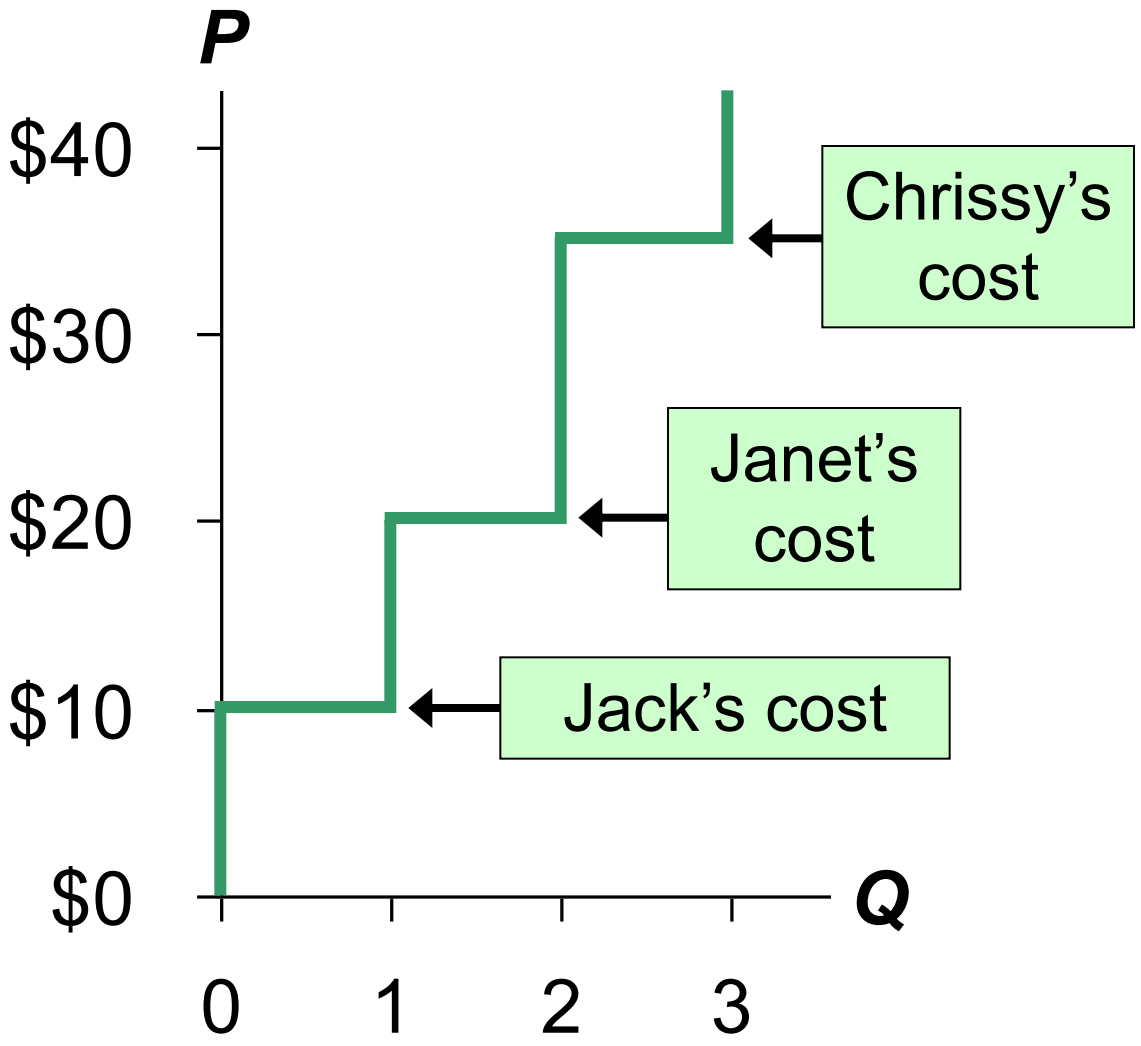
P	Q_s
$0 – 9	0
10 – 19	1
20 – 34	2
35 & up	3

V. Cost and the Supply Curve 3 of 4



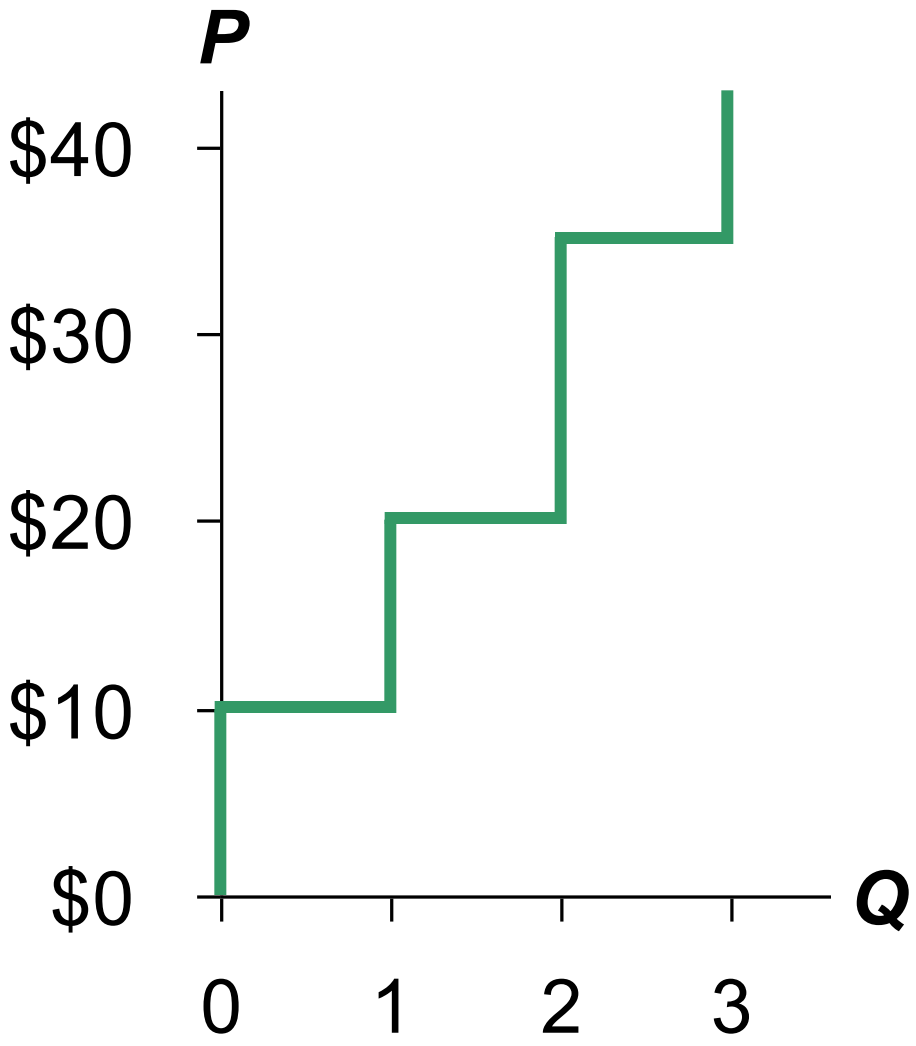
P	Q_s
$0 – 9	0
10 – 19	1
20 – 34	2
35 & up	3

V. 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.

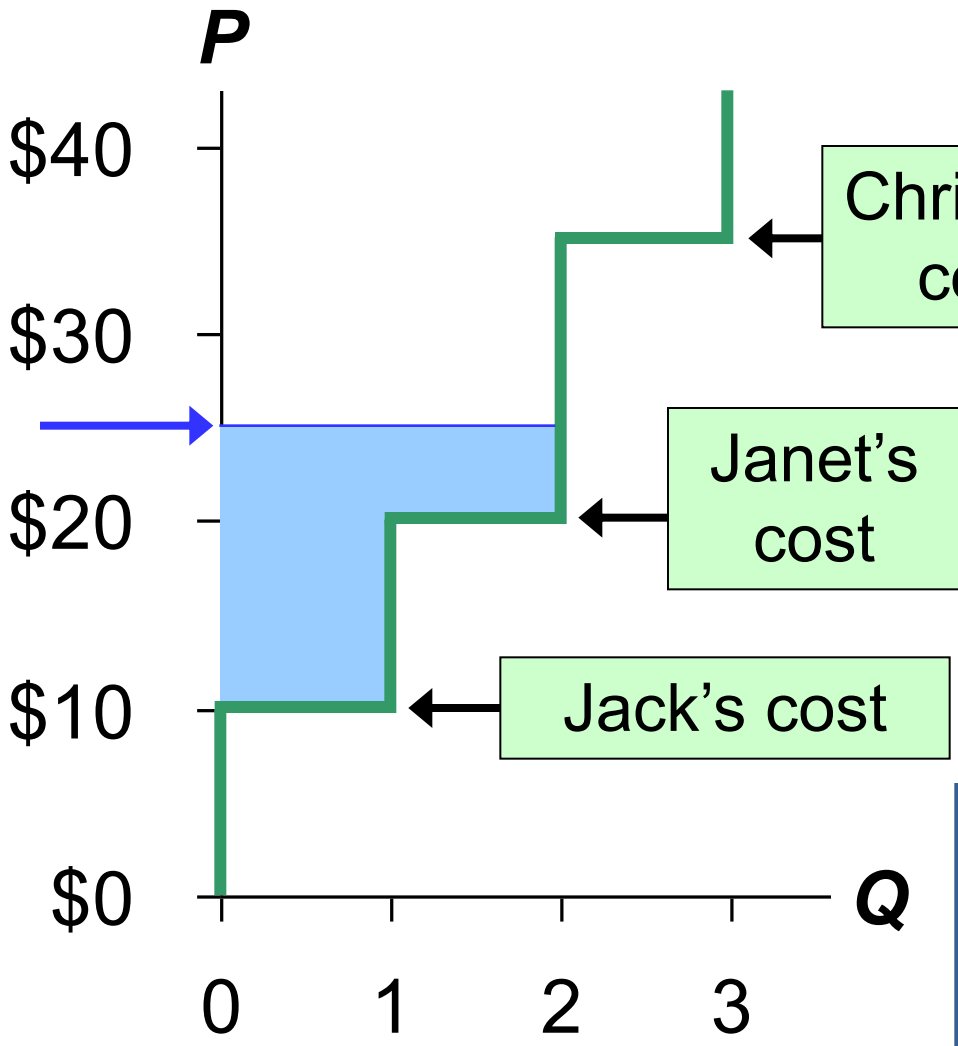
Producer Surplus



PS = ***P*** – cost

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

VI. Producer Surplus and the S Curve



PS = ***P*** – cost

Suppose ***P*** = $25.

Jack's PS = $15

Janet's PS = $5

Chrissy's PS = $0

Total PS = $20

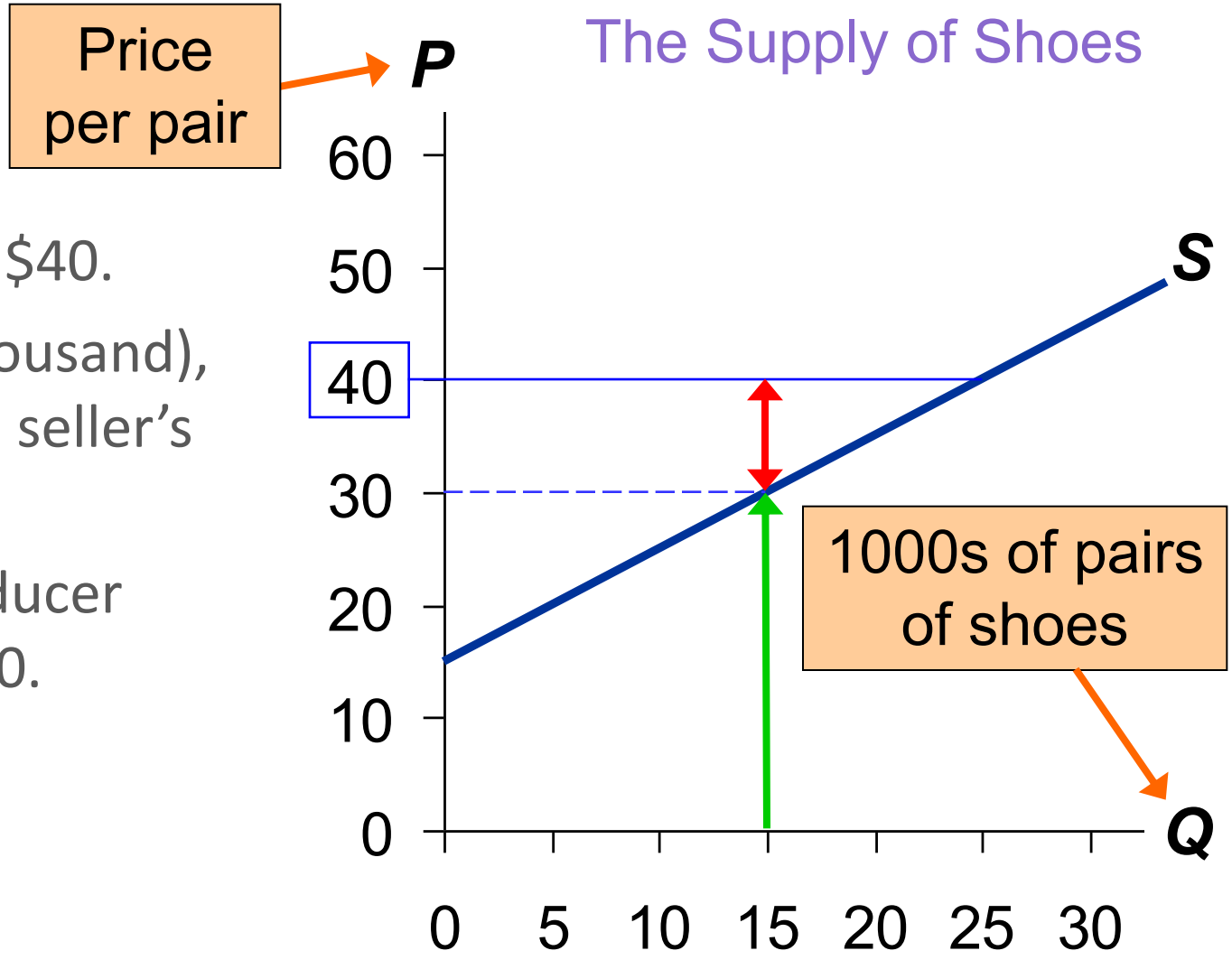
*Total PS equals the area above the supply curve under the price, from 0 to **Q**.*

VII. 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.



VII. PS with Lots of Sellers & a Smooth S Curve

PS is the area between ***P*** and the ***S*** curve, from 0 to ***Q***.

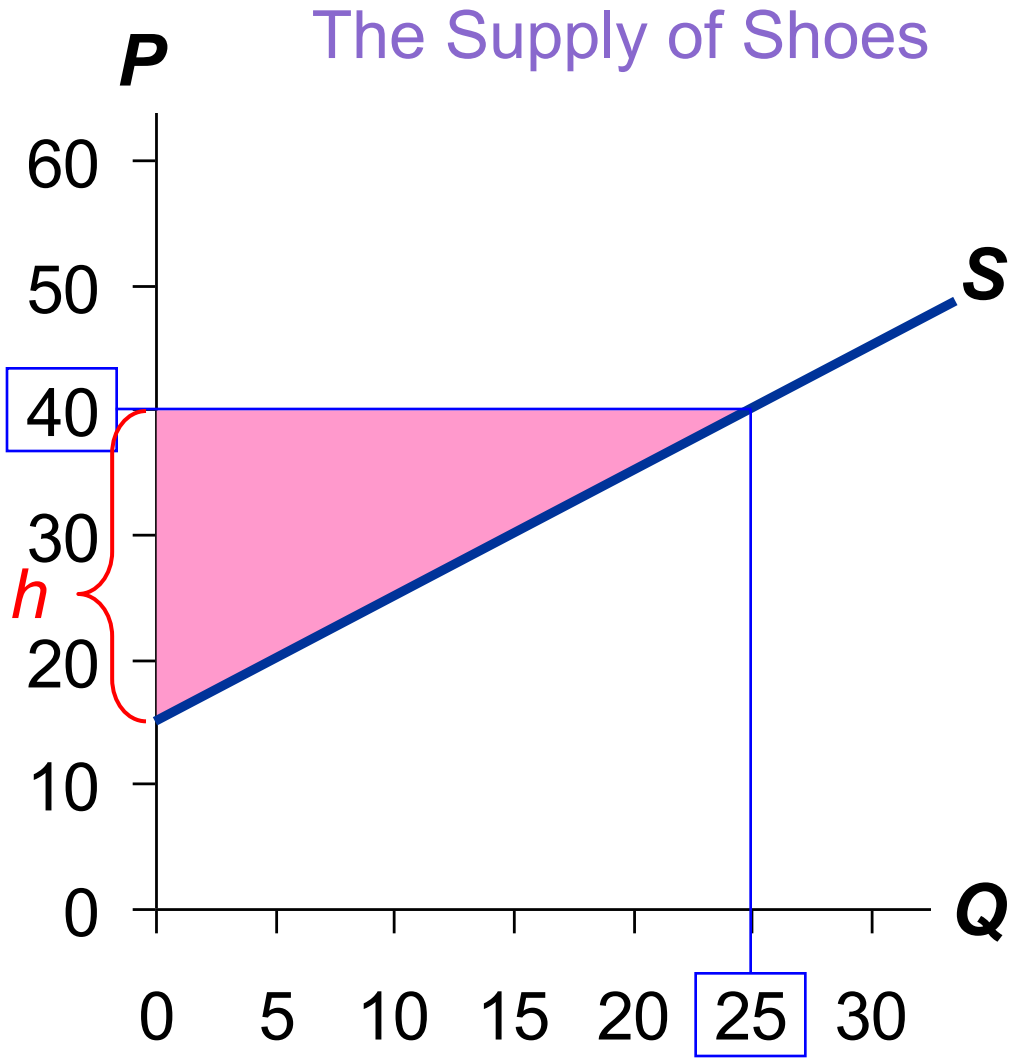
The height of this triangle is $40 – 15 = $25.

So,

PS = ½ x *b* x *h*

= ½ x 25 x $25

= $312.50



How a Lower Price Reduces PS

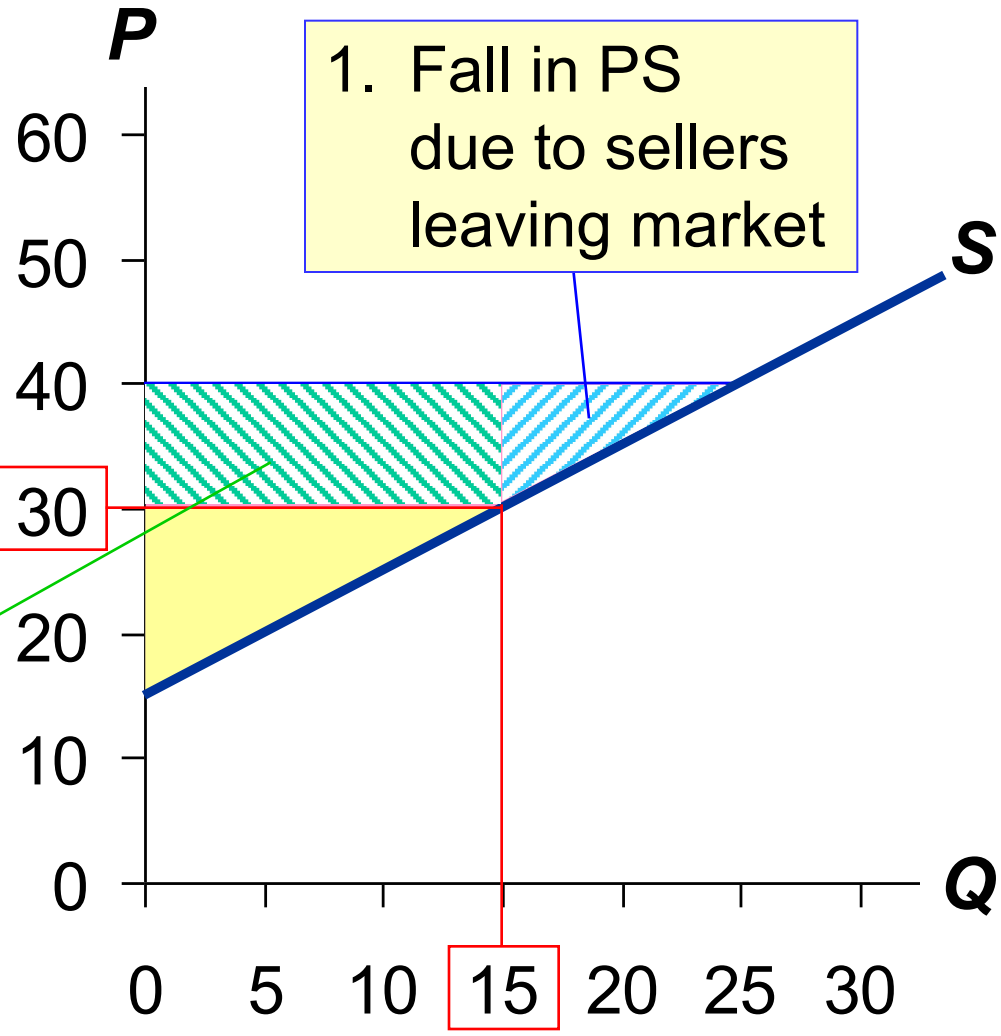
If ***P*** falls to \$30,

PS = ½ x 15 x \$15

= \$112.50

Two reasons for the fall in PS.

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



Example: Producer Surplus

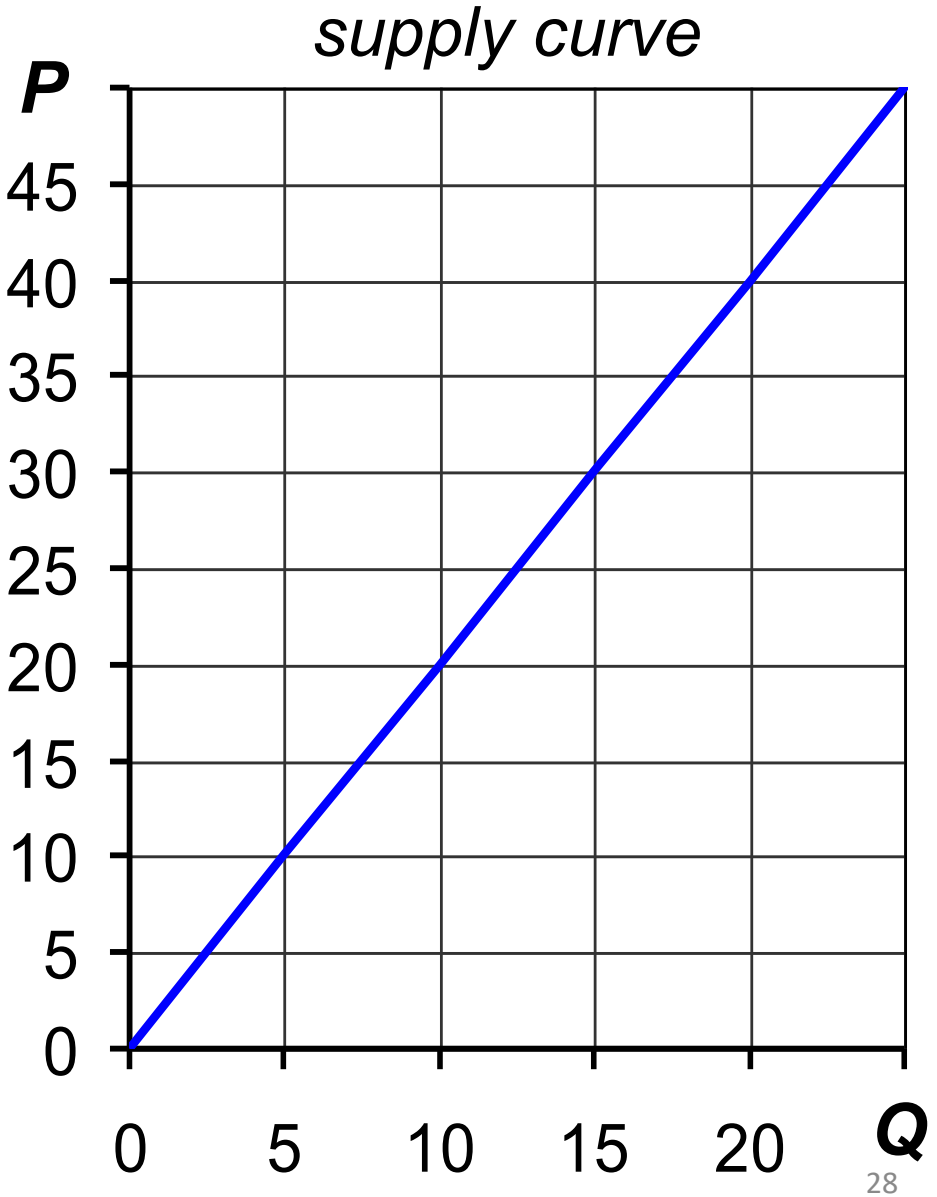
A. Find marginal seller's cost at ***Q*** = 10.

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

Suppose ***P*** rises to $30. Find the increase in PS due to:

C. selling 5 additional units

D. getting a higher price on the initial 10 units



Example: Producer Surplus

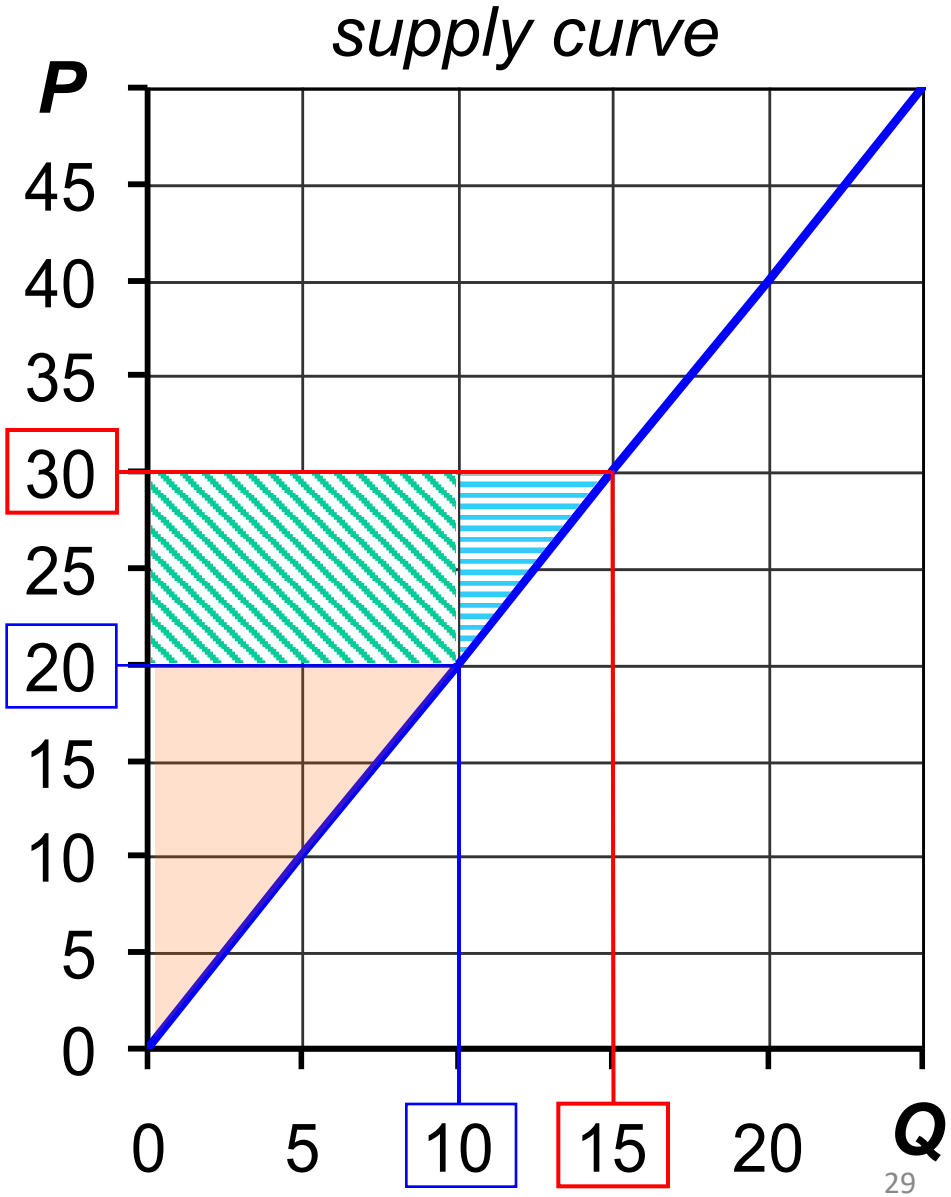
A. At ***Q*** = 10,
marginal cost = $20

B. PS = ½ x 10 x $20
= $100

P rises to $30.

C. PS on
additional units
= ½ x 5 x $10 = $25

D. Increase in PS
on initial 10 units
= 10 x $10 = $100



VIII. 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)

IX. 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.)

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

XI. Evaluating the Market Equilibrium

Market Equilibrium:

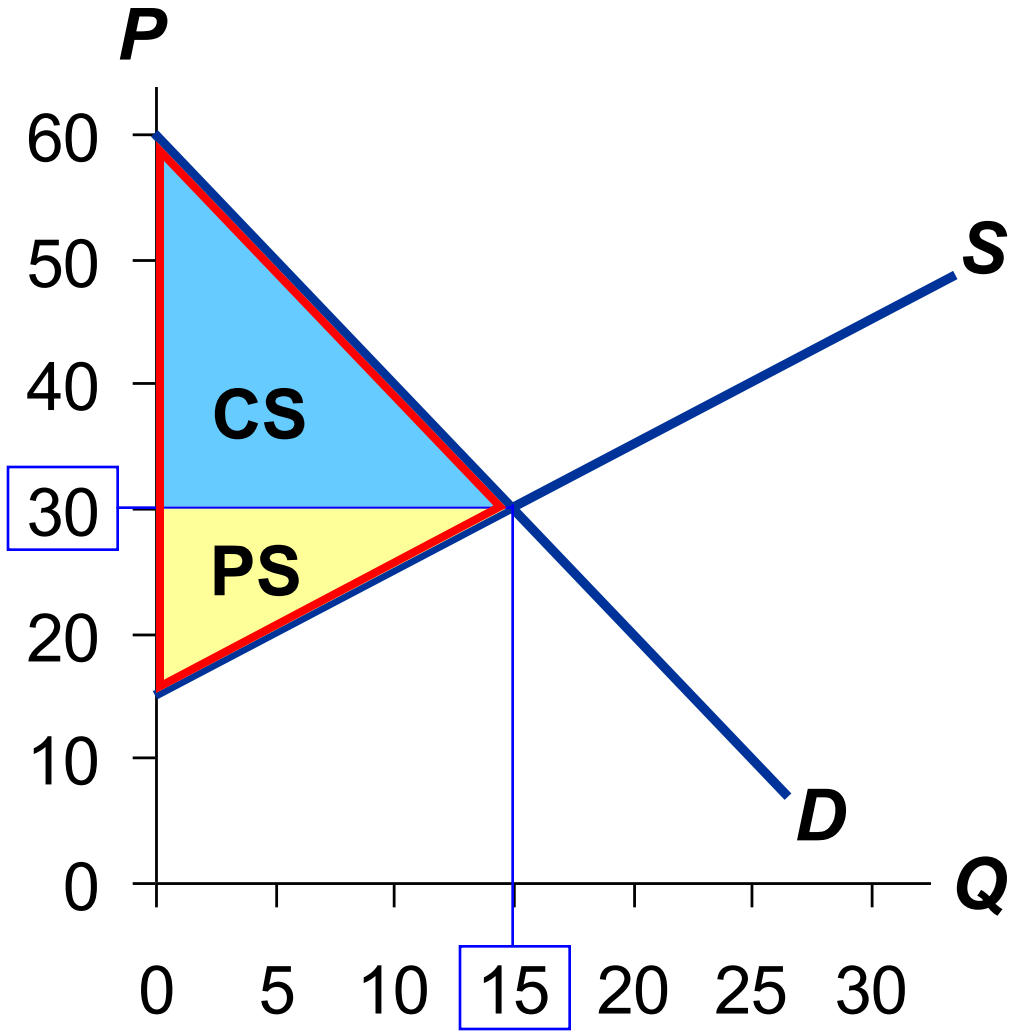
P = $30

Q = 15,000

Total surplus

= CS + PS

Is the market equilibrium efficient?

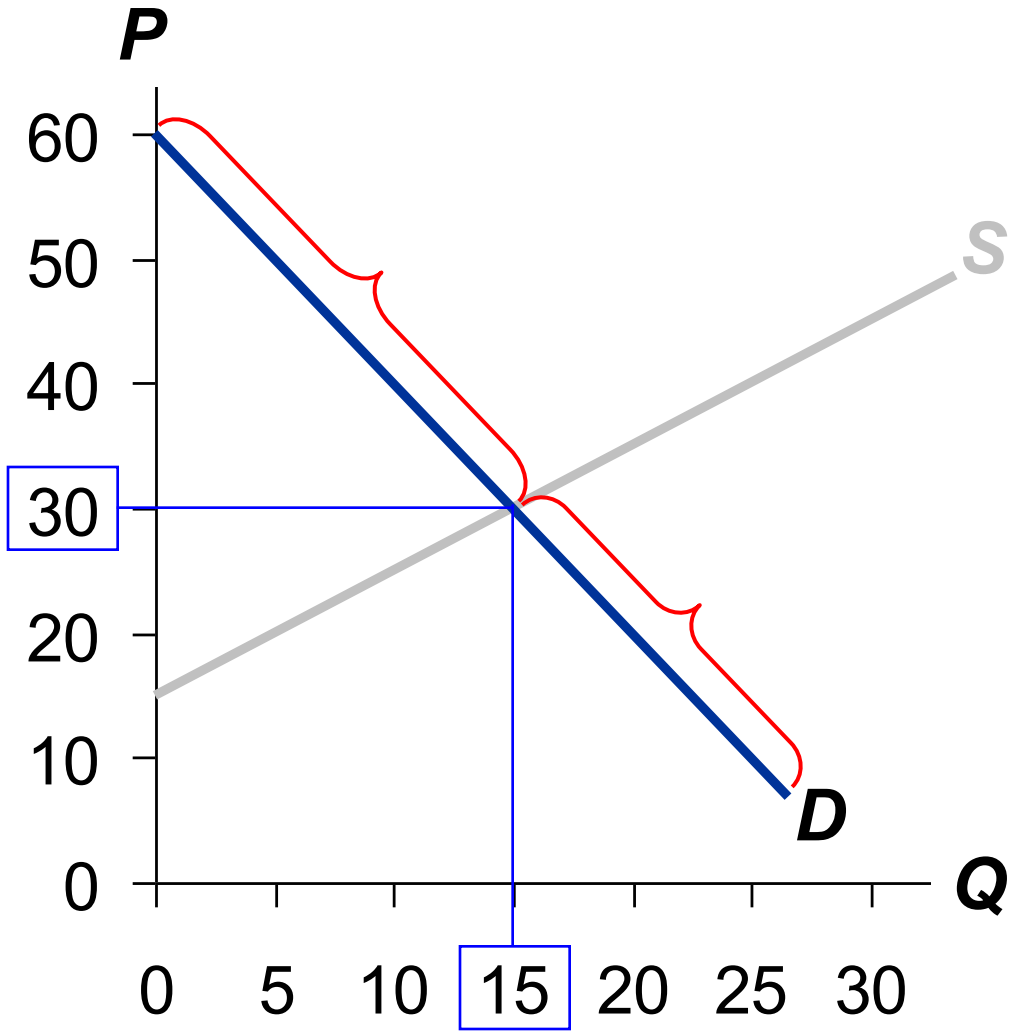


Which Buyers Consume the Good?

Every buyer whose WTP is ≥ $30 will buy.

Every buyer whose WTP is < $30 will not.

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

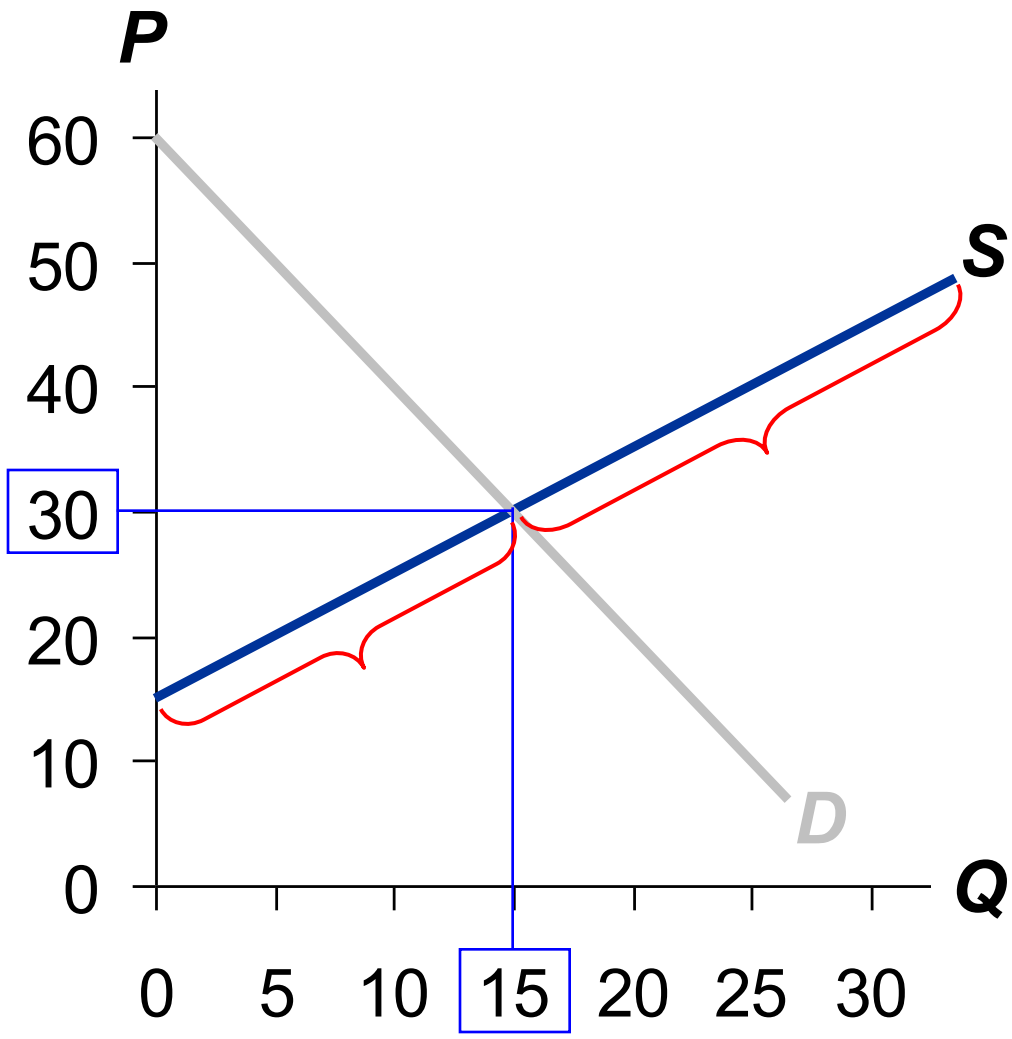


Which Sellers Produce the Good?

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

Every seller whose cost is > $30 will not.

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



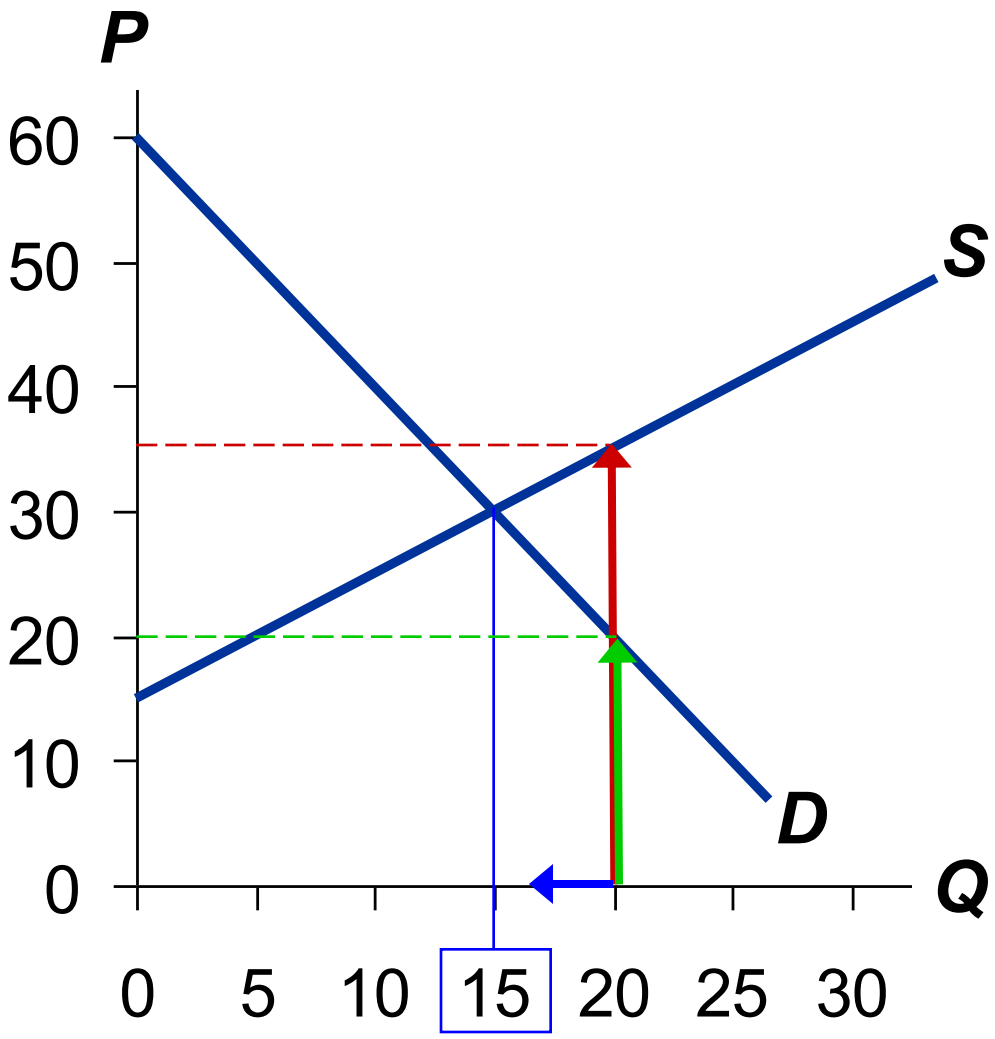
Does Equilibrium *Q* Maximize Total Surplus?

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.*



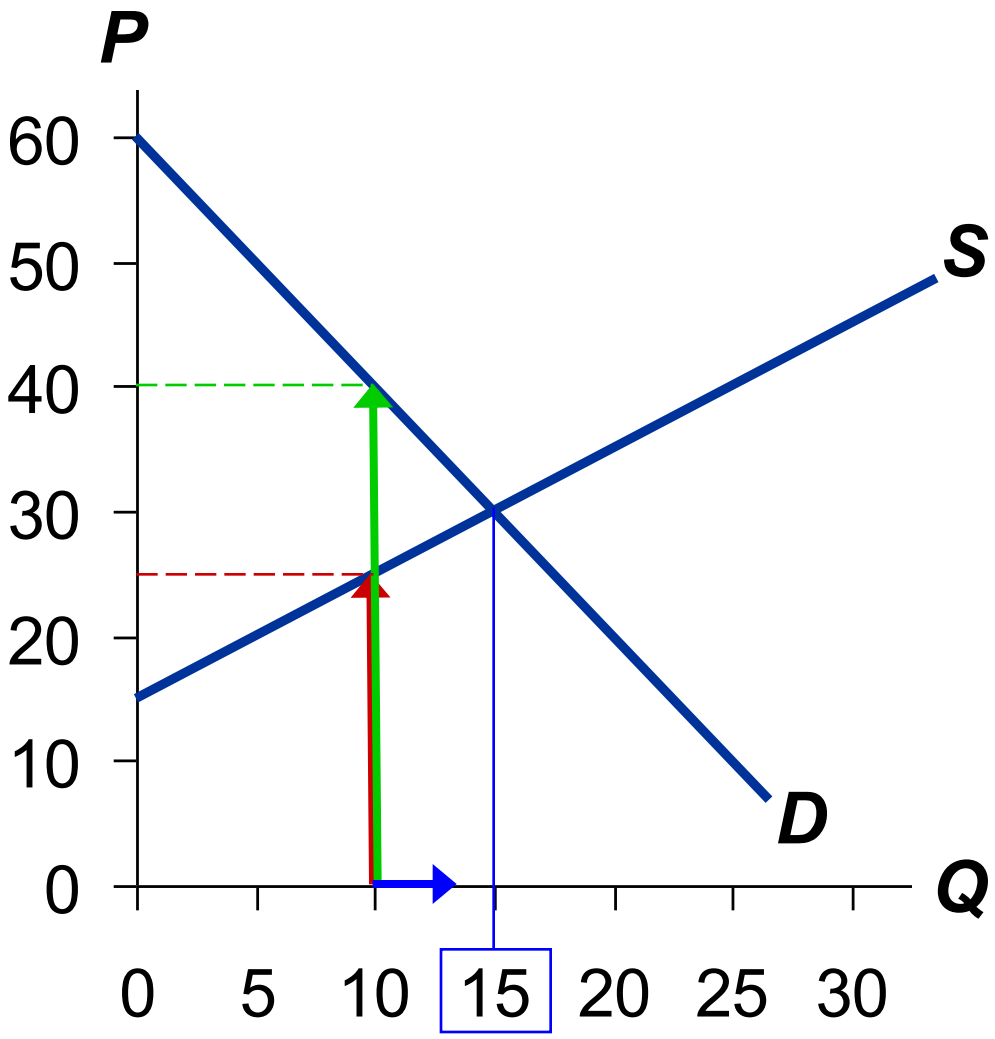
Does Equilibrium Q Maximize Total Surplus?

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

value to consumers
of the marginal unit
is $40

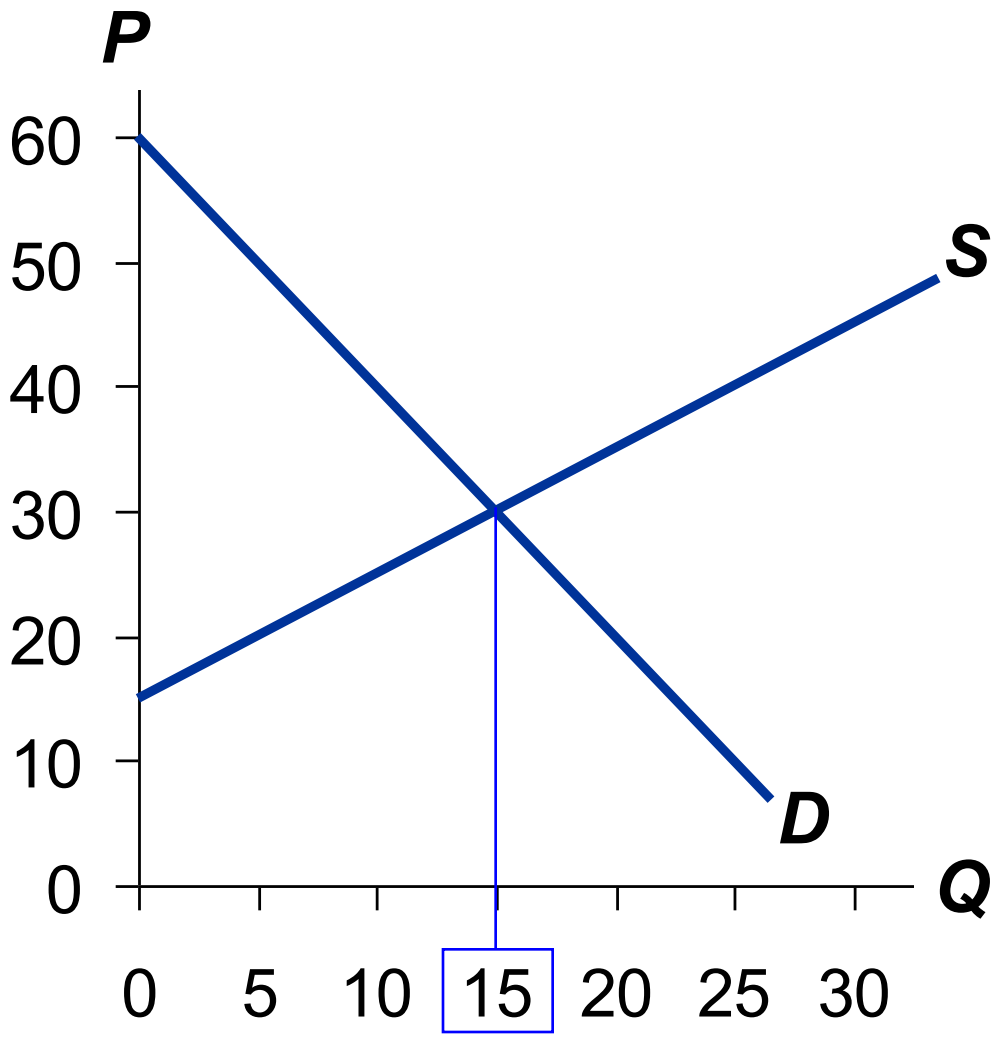
Hence, can increase
total surplus
by increasing ***Q***.

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



Does Equilibrium Q Maximize Total Surplus?

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



XII. The Free Market vs. Government Intervention

- 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 planner would need to know every seller's cost and every buyer's WTP for every good in the entire economy.
- This is impossible, and why centrally-planned economies are never very efficient.

XIII. The Free Market vs. Central Planning

- 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.
- *Laissez faire* (French for "allow them to do"): the notion that the government should not interfere with the market.

Conclusion 1 of 2

- This chapter used welfare economics to demonstrate one of the Ten Principles:

  Markets are usually a good way to organize economic activity.

- Important note:
  We derived these lessons assuming perfectly competitive markets.

- In other conditions we will study in later chapters, the market may fail to allocate resources efficiently…

Conclusion 2 of 2

- Such market failures occur when:
  - a buyer or seller has market power—the ability to affect the market price.
  - transactions have side effects, called externalities, that affect bystanders. (example: pollution)
- We'll use welfare economics to see how public policy may improve on the market outcome in such cases.
- Despite the possibility of market failure, the analysis in this chapter applies in many markets, and the invisible hand remains extremely important.

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.