



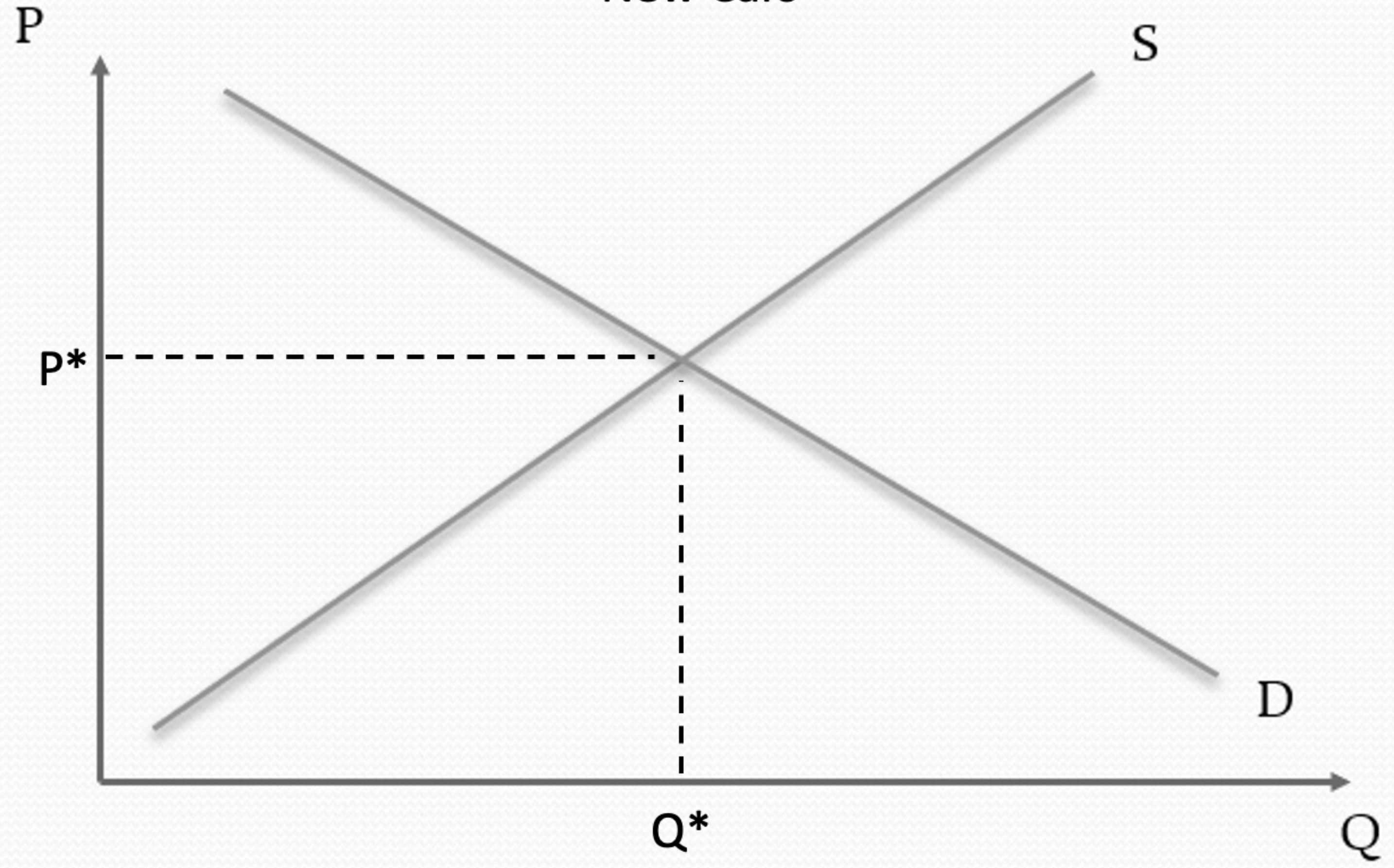
# MARKET EFFICIENCY

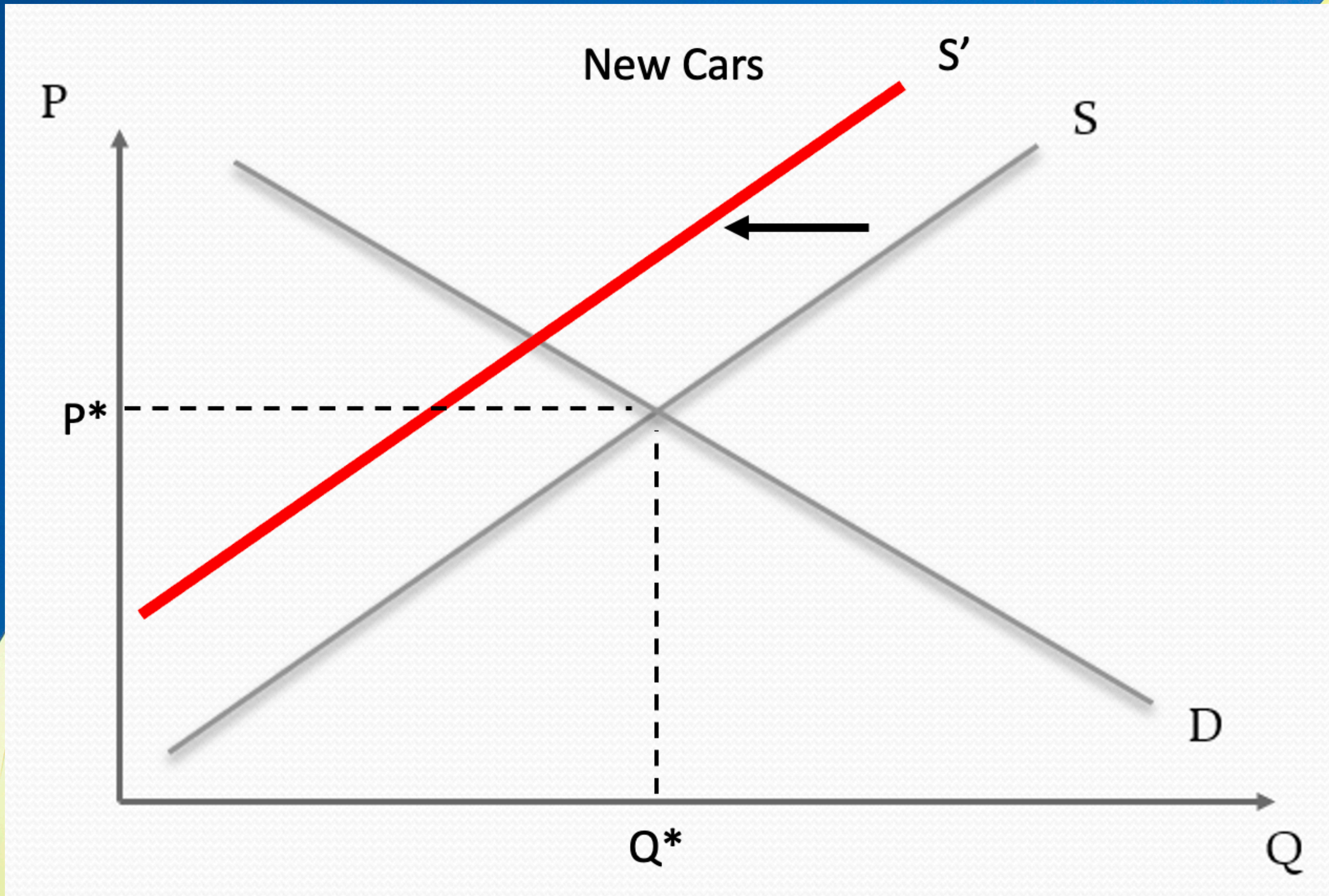
BECO 3310 Fall 2025

**Review**

- If there is a shortage in computer chips used in the production of new cars, why would the price of used cars increase?

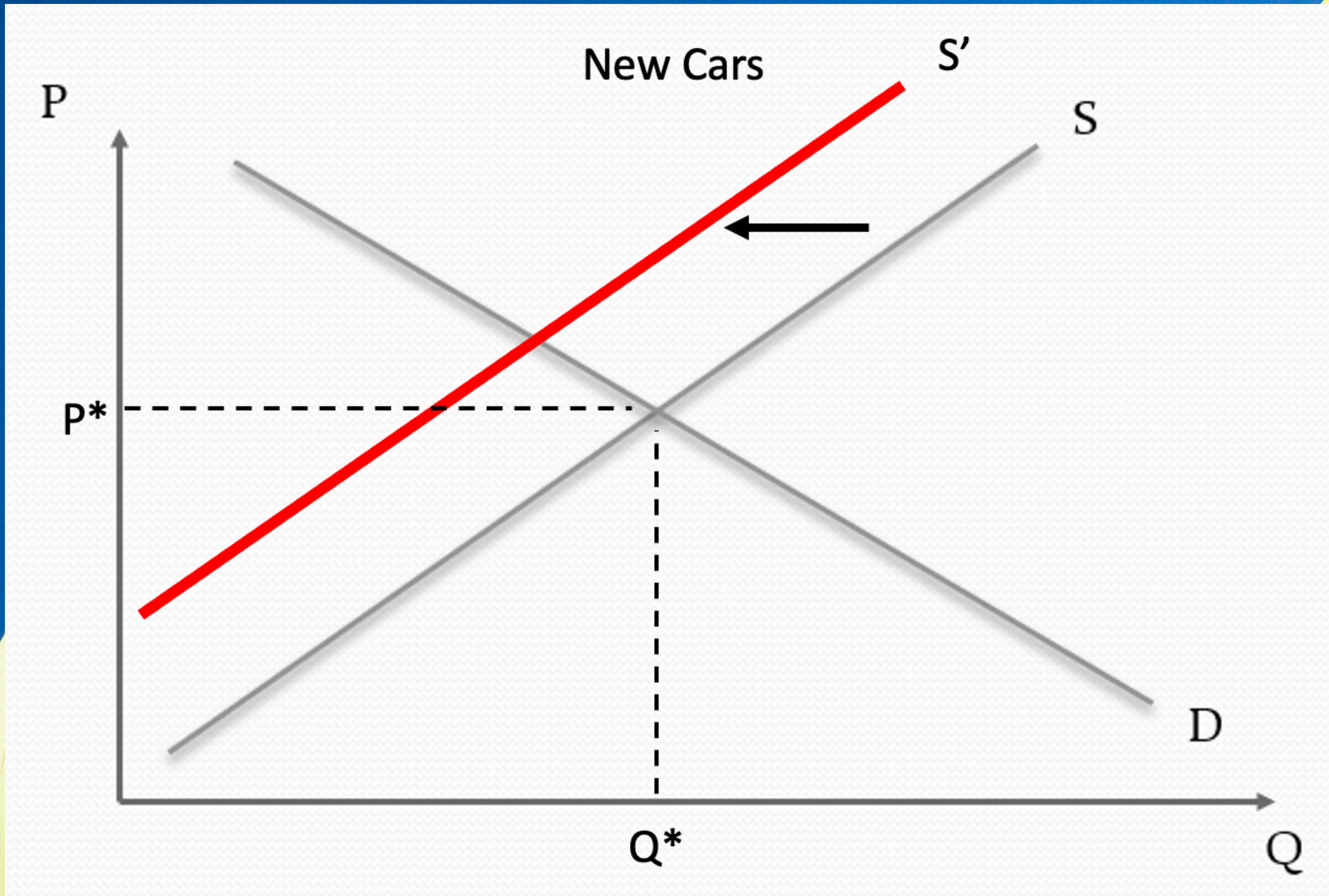
# New Cars





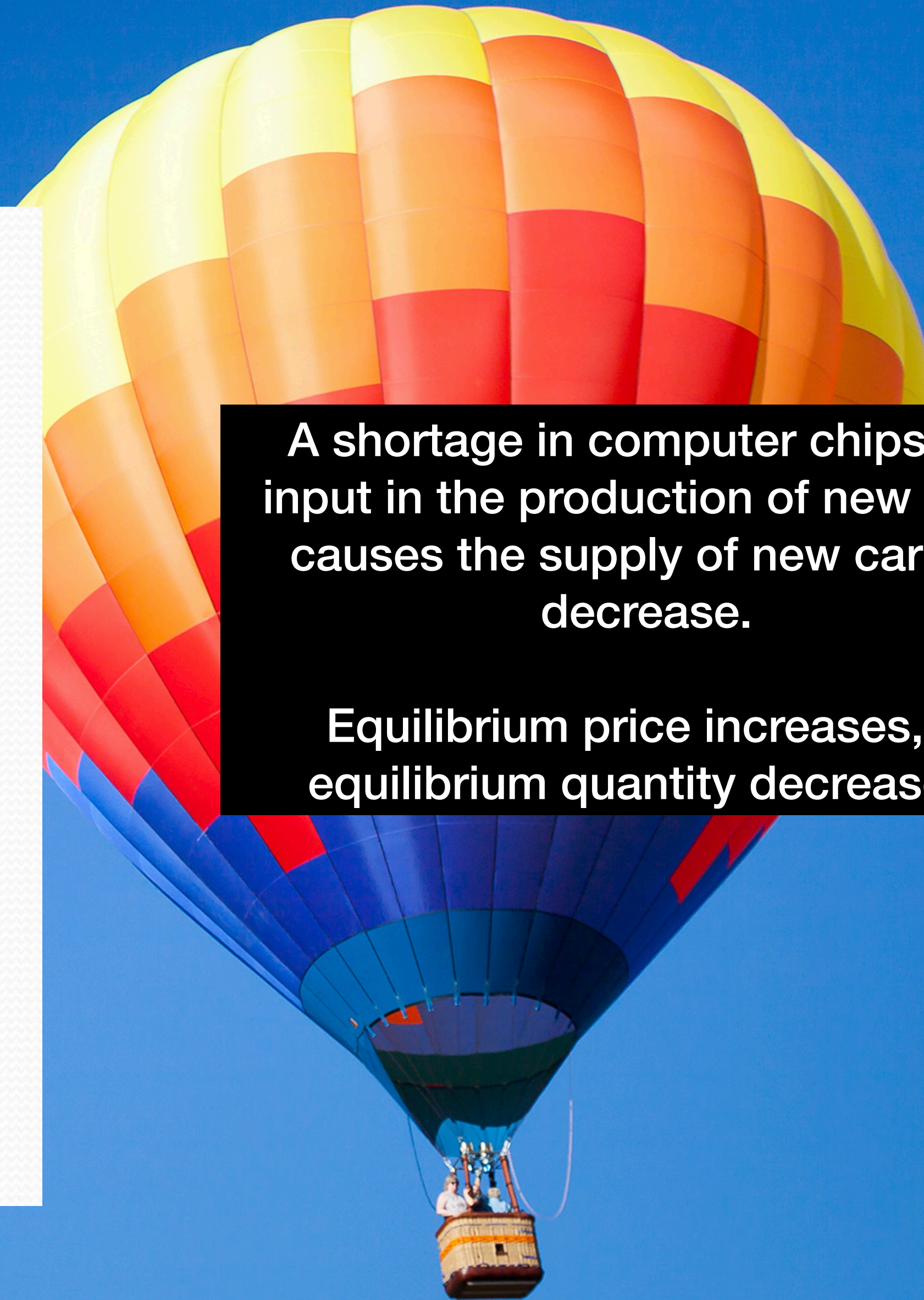
A shortage in computer chips, an input in the production of new cars, causes the supply of new cars to decrease.

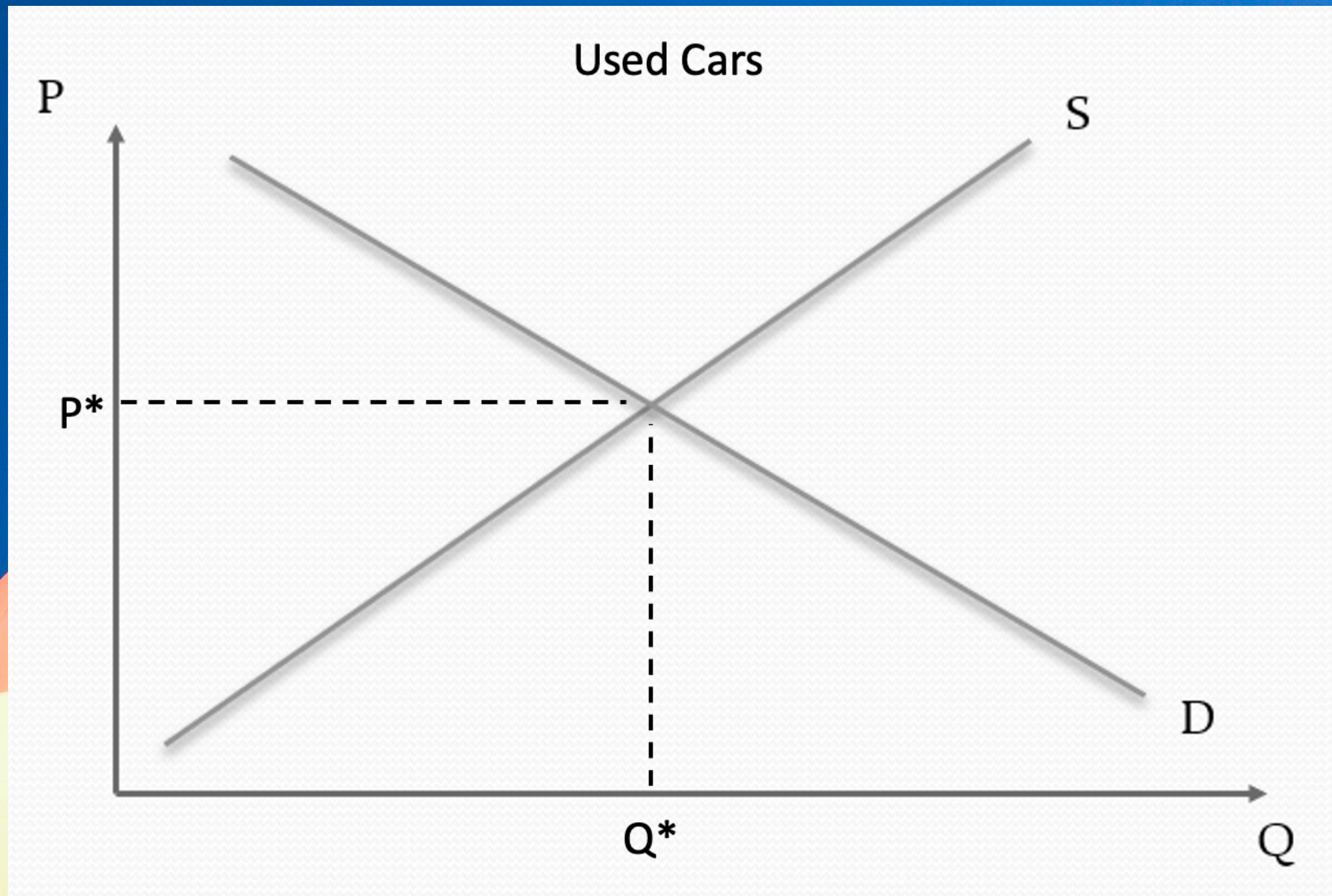




A shortage in computer chips, an input in the production of new cars, causes the supply of new cars to decrease.

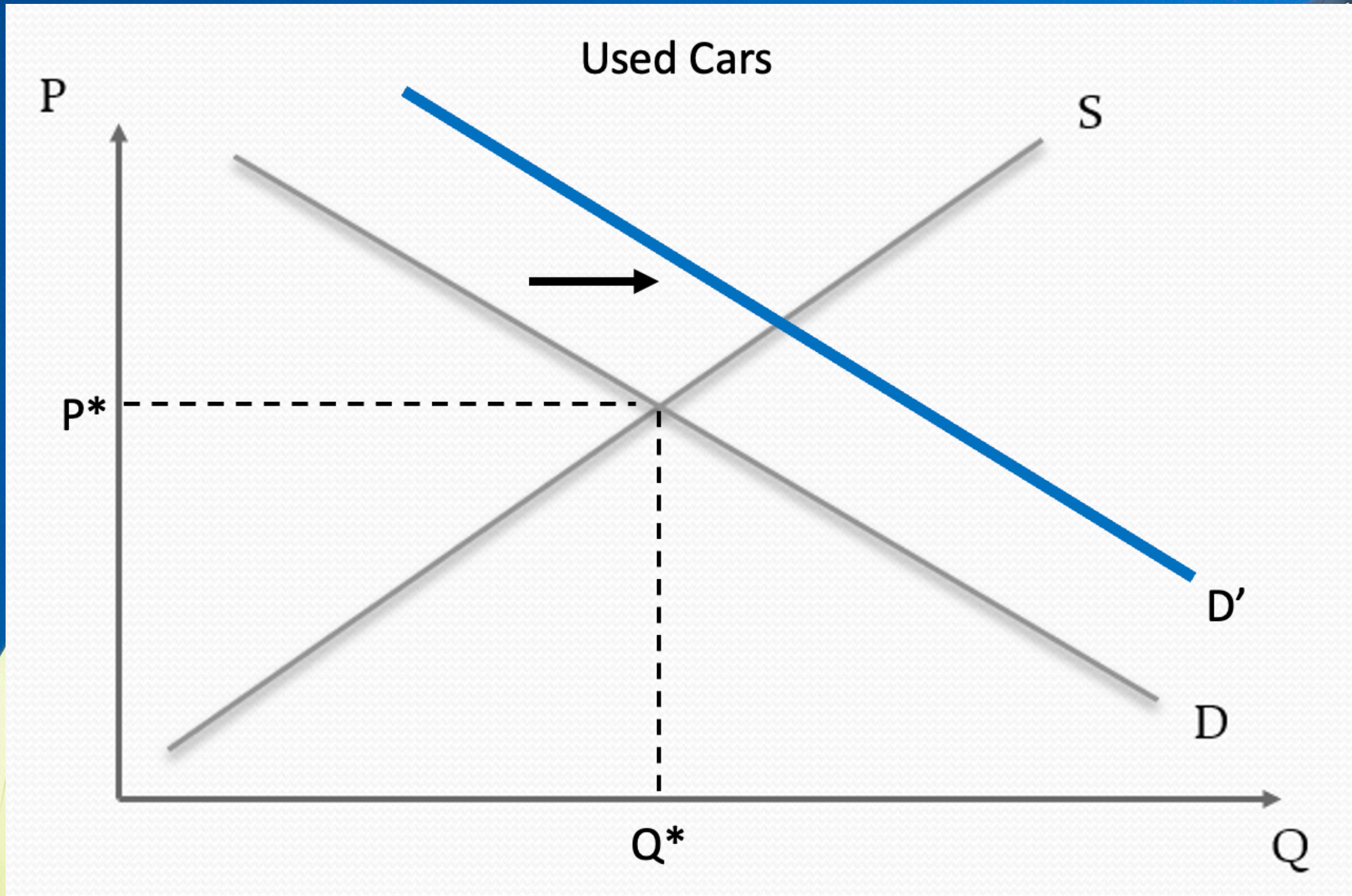
Equilibrium price increases, & equilibrium quantity decreases.



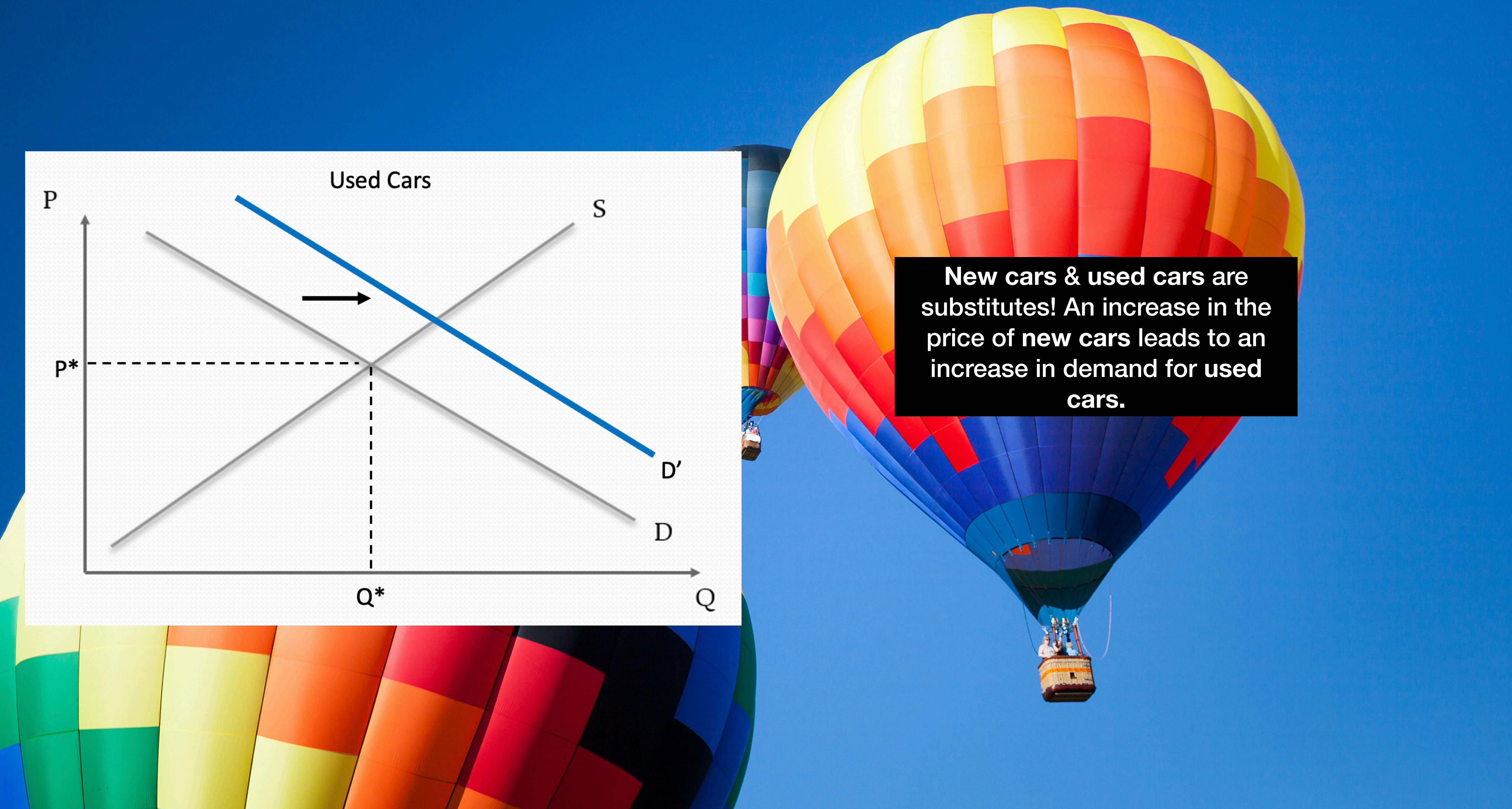


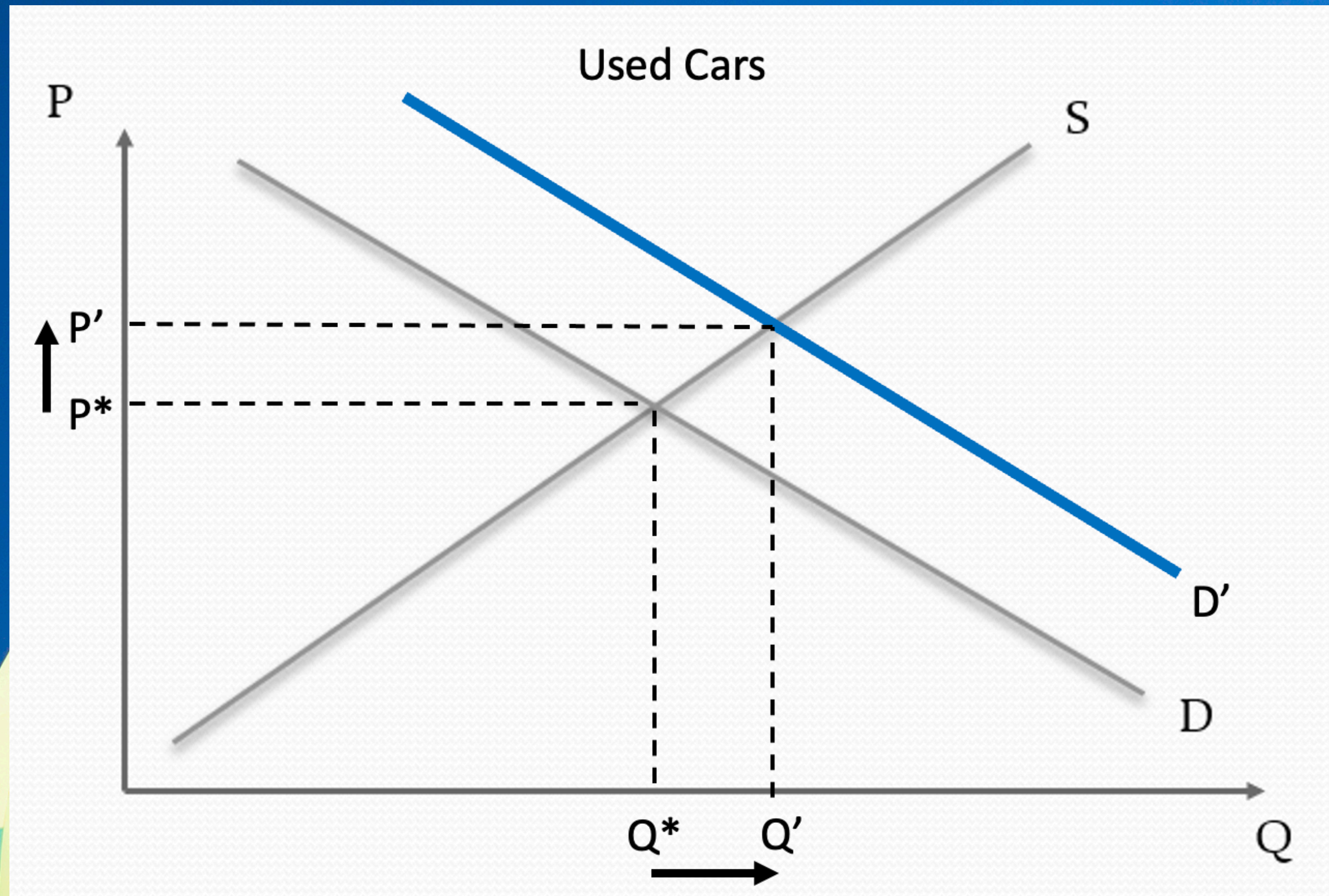
Used cars are already made. Why would a chip shortage that affects new cars affect the price of used cars?



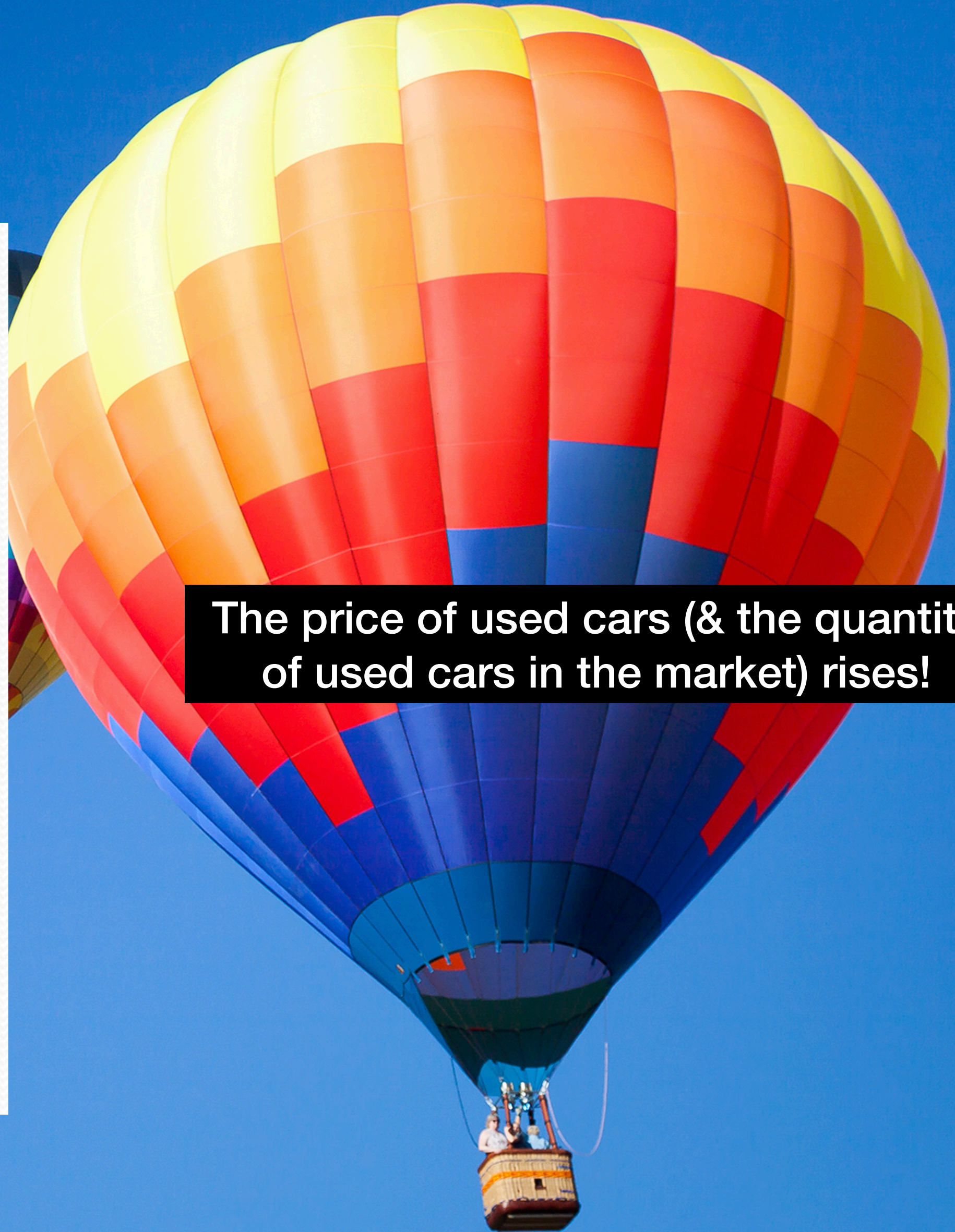


**New cars & used cars are substitutes! An increase in the price of new cars leads to an increase in demand for used cars.**

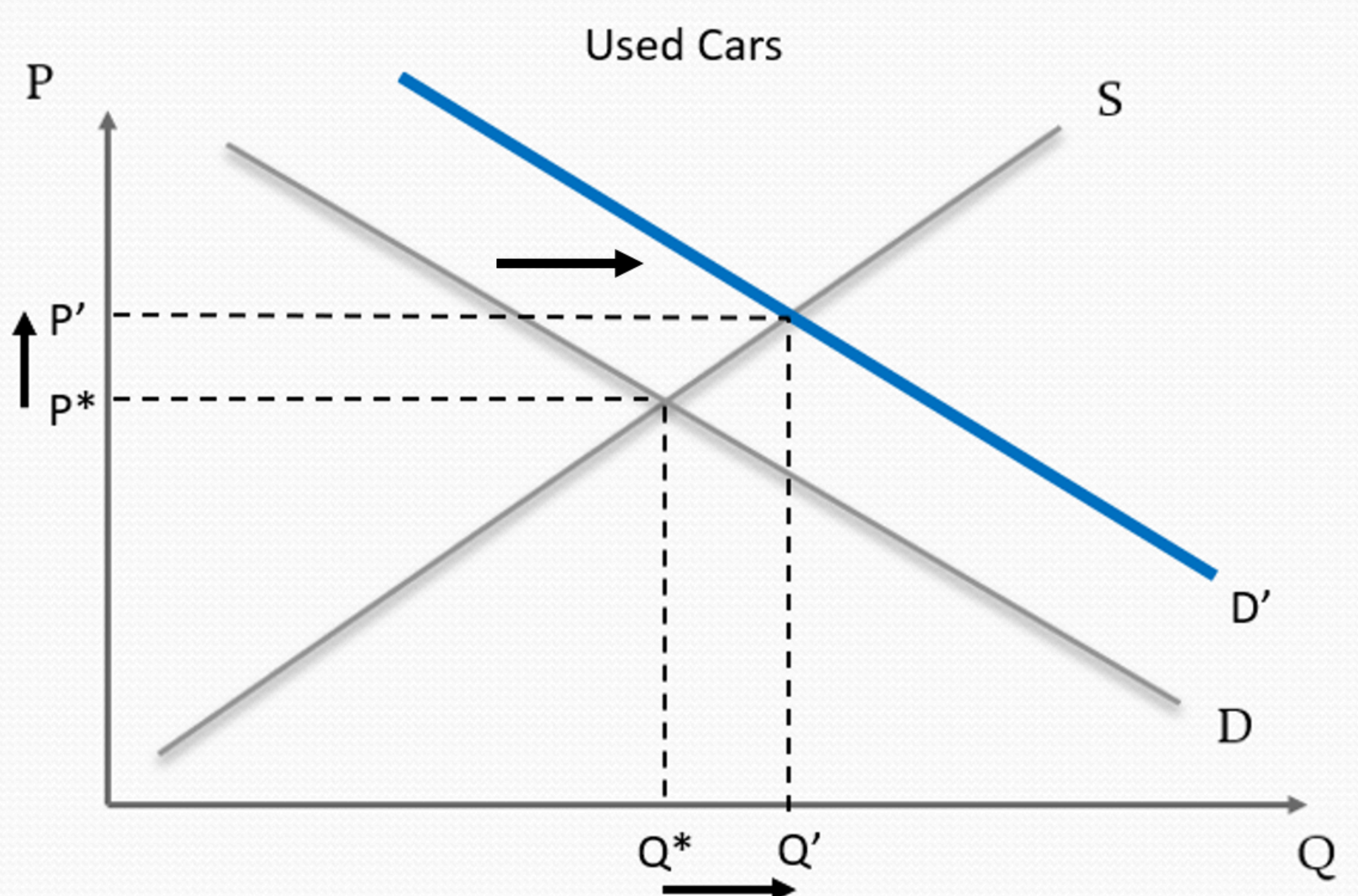
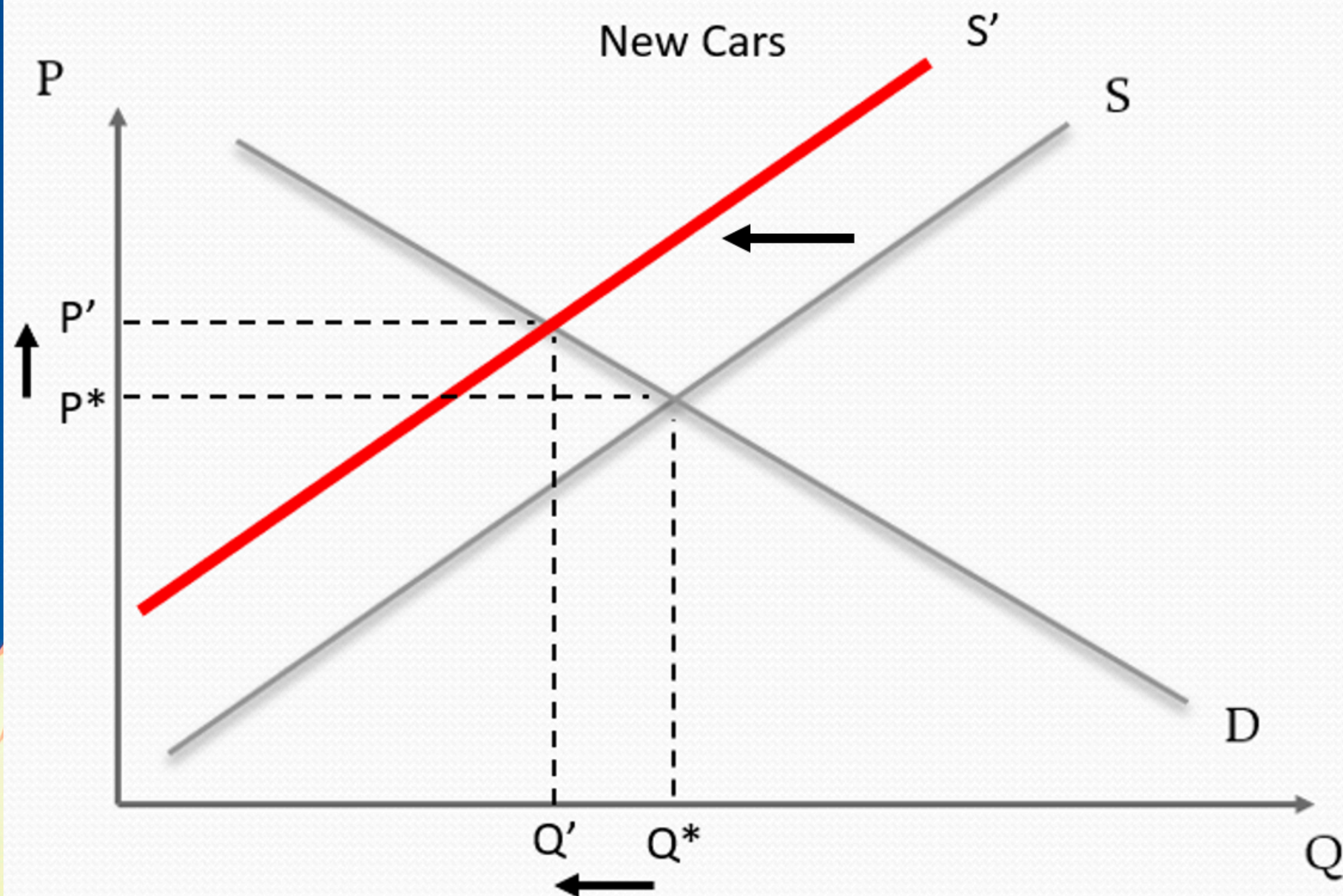




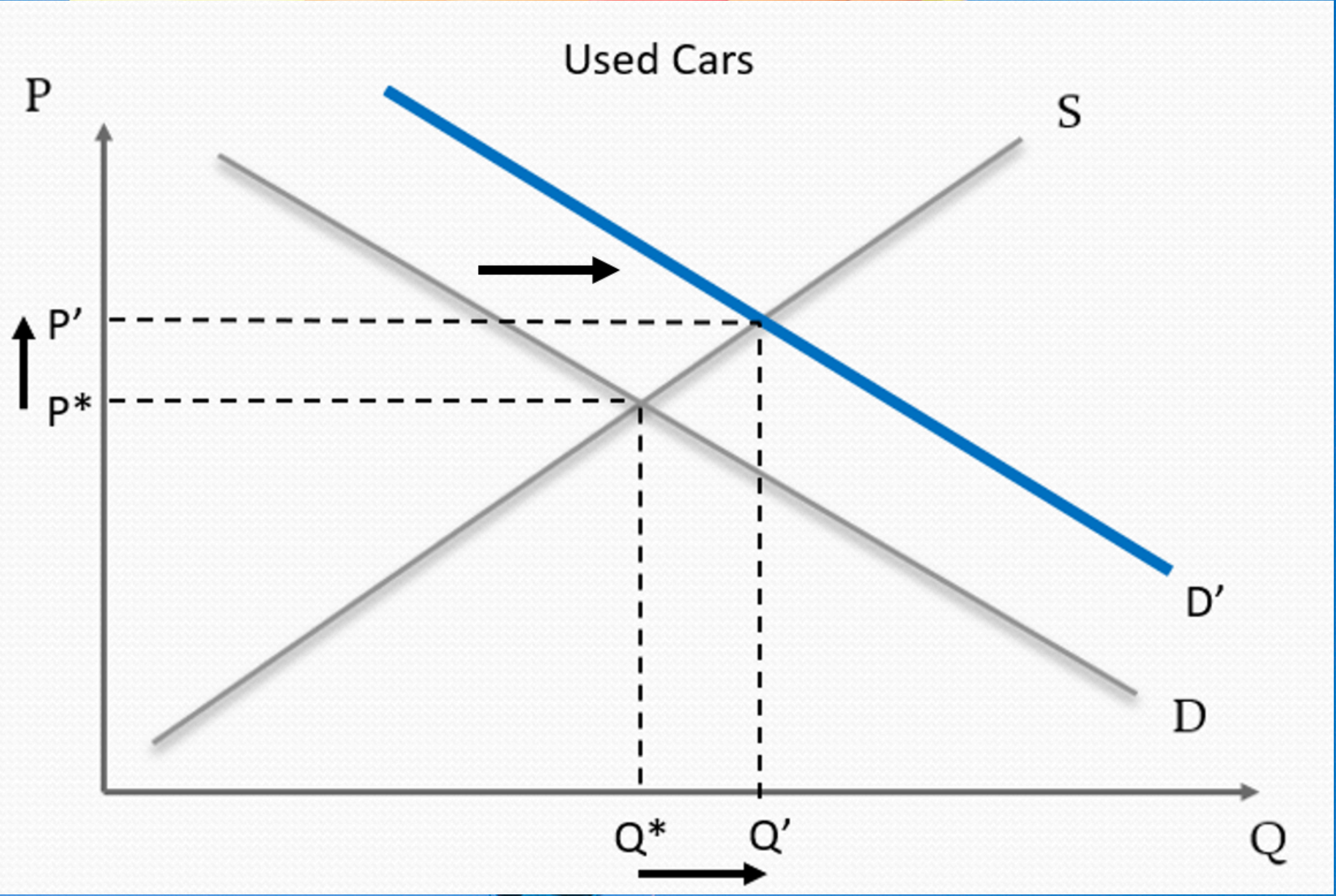
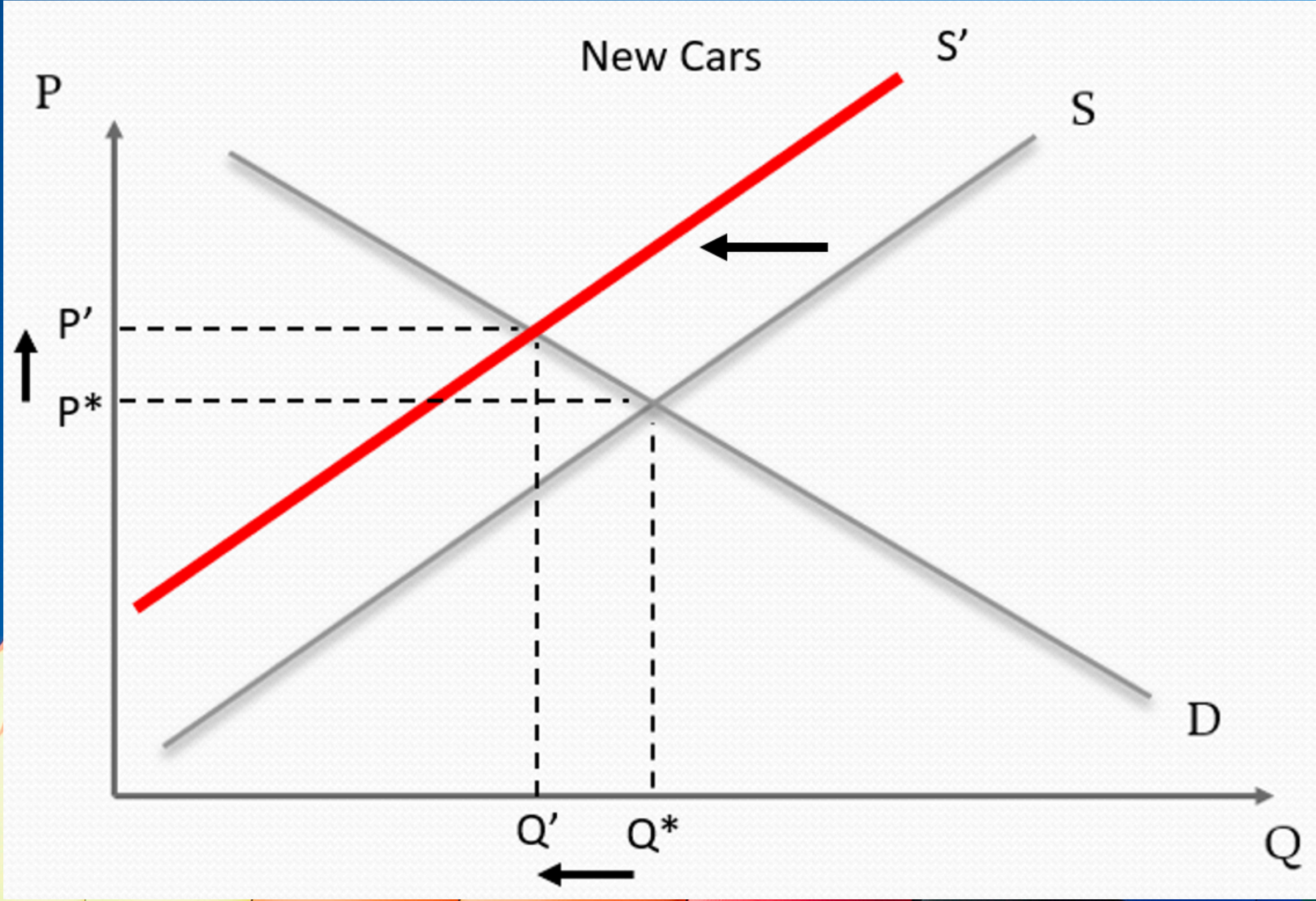
The price of used cars (& the quantity of used cars in the market) rises!



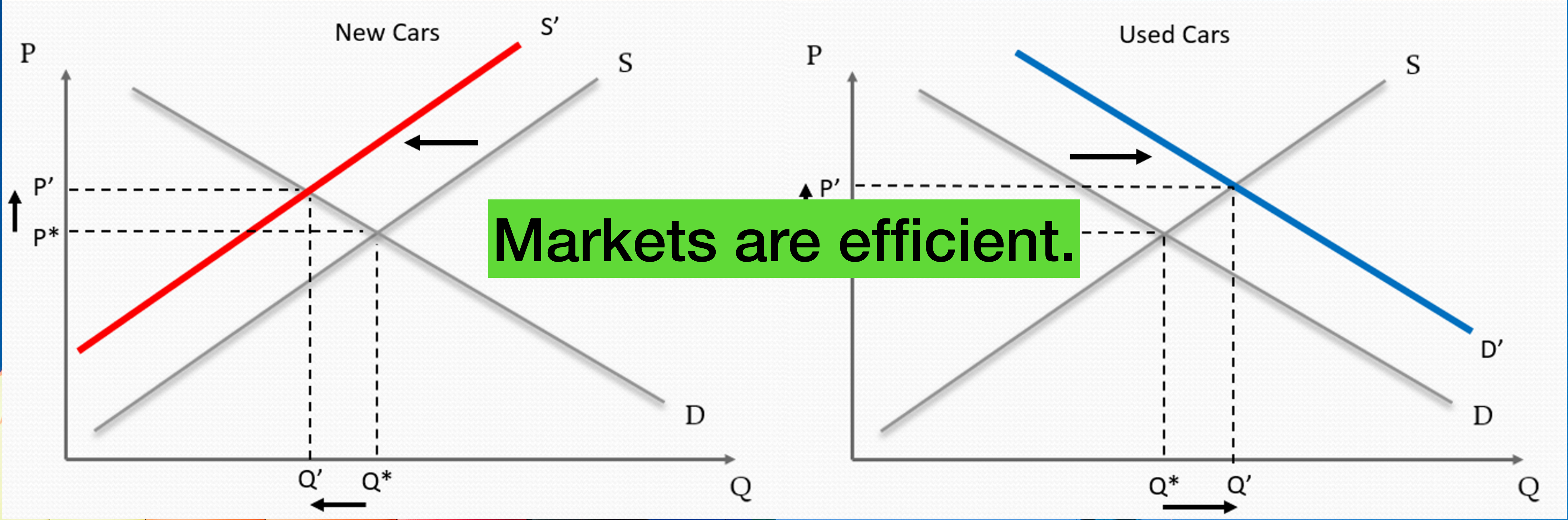
Markets are very interconnected



Markets are very interconnected.  
A change in one market leads to changes in others.  
They still clear & maximize value for everyone involved.



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# Market Efficiency

# Welfare Economics

- The study of how the allocation of scarce resources affects economic well-being.
  - Benefits that buyers and sellers receive from engaging in market transactions.
  - How society can make these benefits as large as possible.
  - In any market, the equilibrium of supply and demand maximizes the total benefits received by all buyers and sellers combined.

# Adam Smith's Invisible Hand



- Goods are provided by producers' self-interestedness, not their selflessness.
  - They want to feed themselves, their families, meet their own desires & needs, etc.
- But, in pursuing their self-interest, producers benefit society.
  - They provide things that others want!
- It's in people's self-interest to benefit & serve one another.

# Adam Smith's Invisible Hand



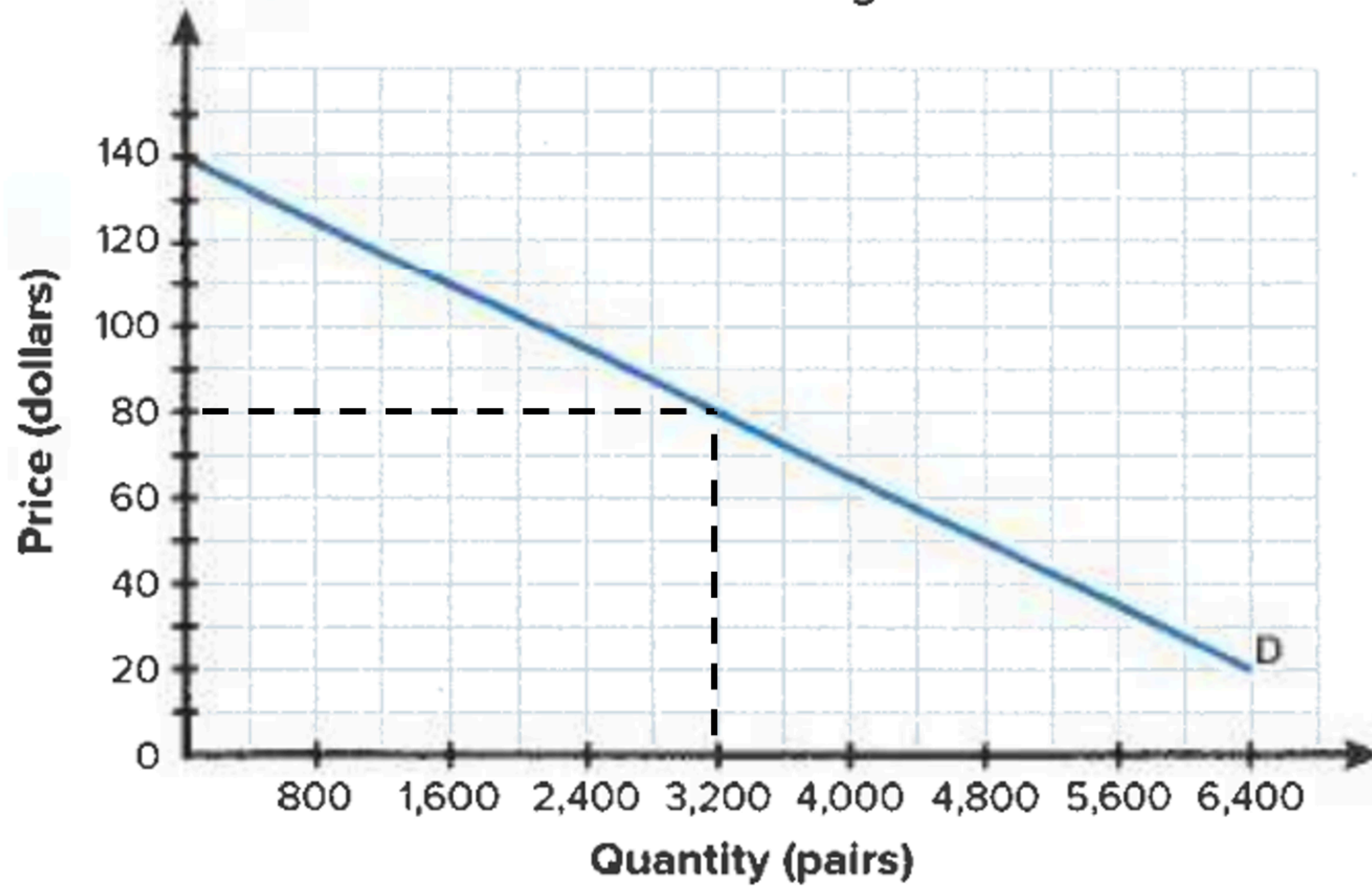
- This voluntary exchange process brings us toward equilibrium!
- Both producers & consumers are better off from value-added exchange.
- We have an EFFICIENT allocation of resources.
  - Economists measure this by looking at the total surplus of an economy.

Consumer surplus

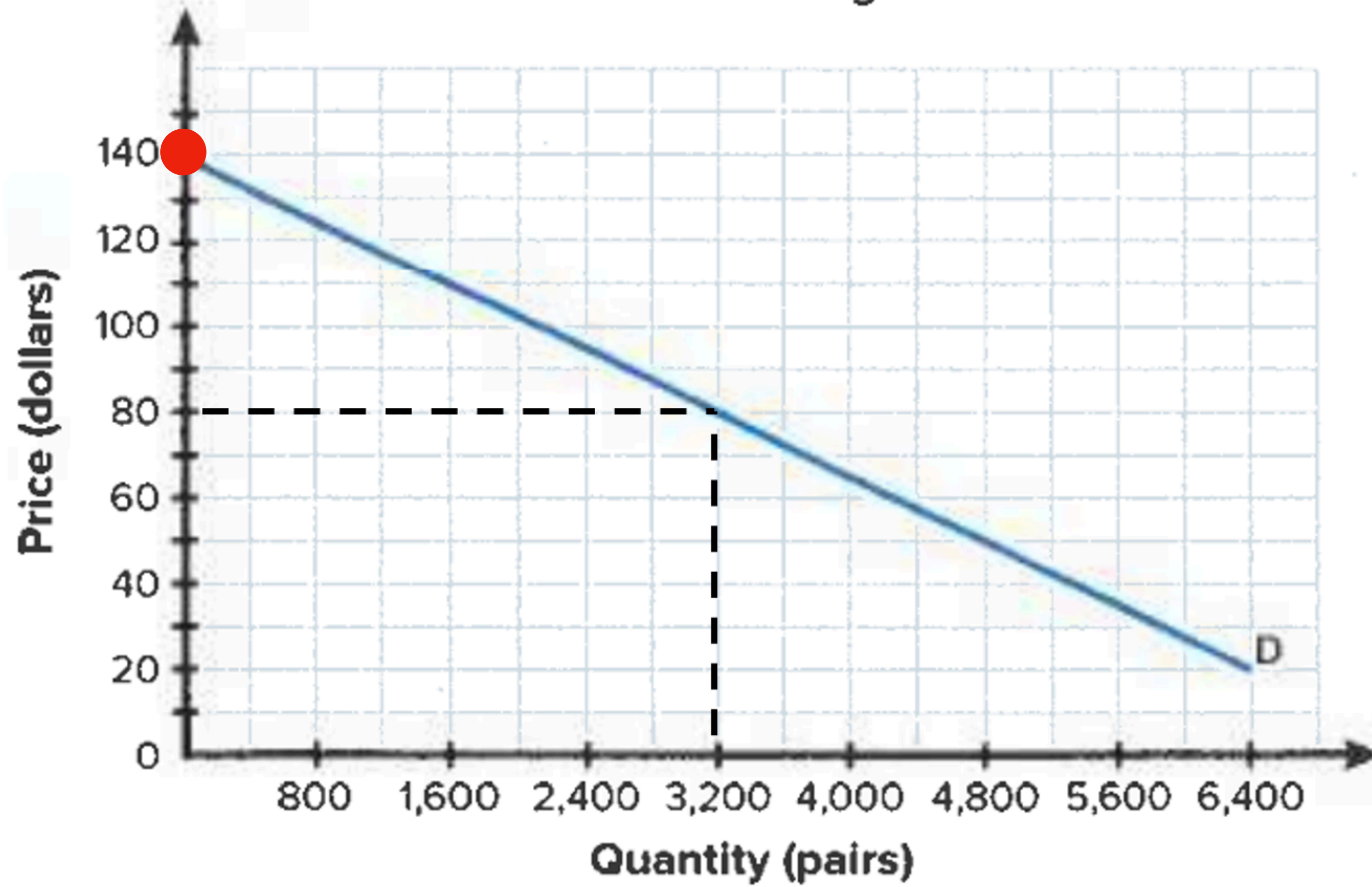
# Consumer Surplus

- Willingness to Pay
  - The maximum amount that a buyer is willing to pay for a good.
- Consumer Surplus
  - The amount that a buyer is willing to pay for a good, minus the amount he/she actually pays for it.
  - The benefit buyers receive from participating in the market.

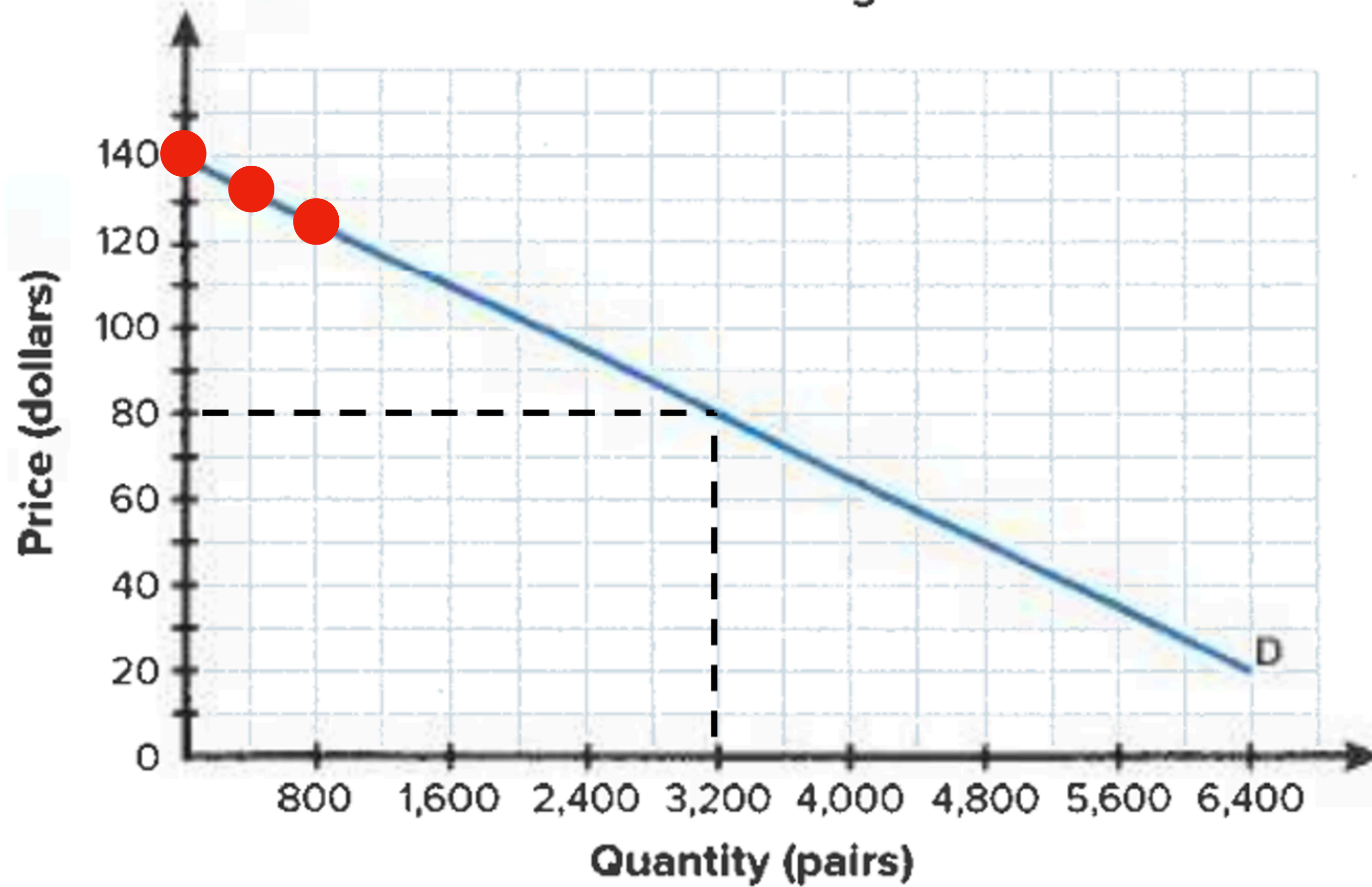
Demand for Sunglasses



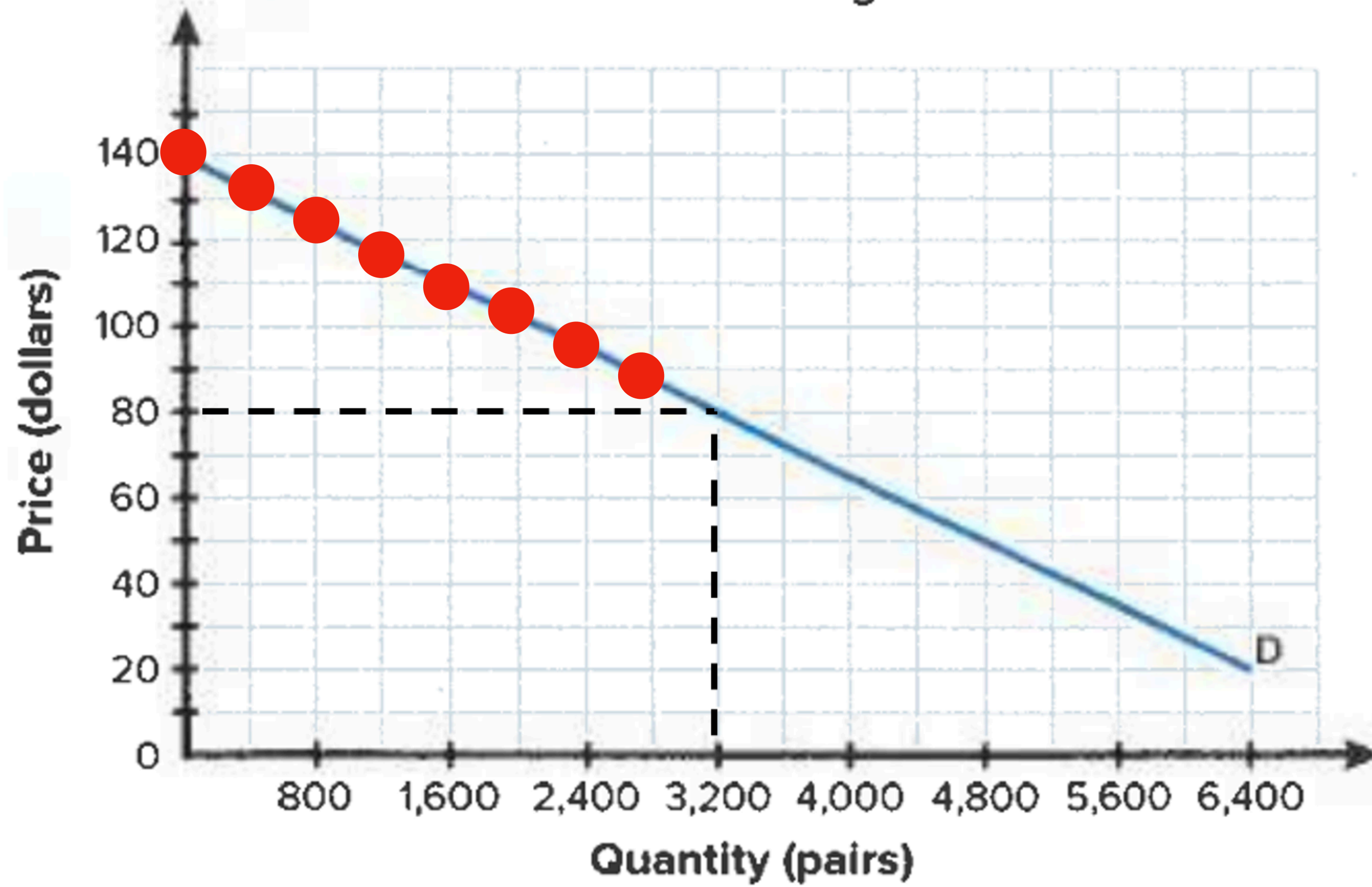
Demand for Sunglasses



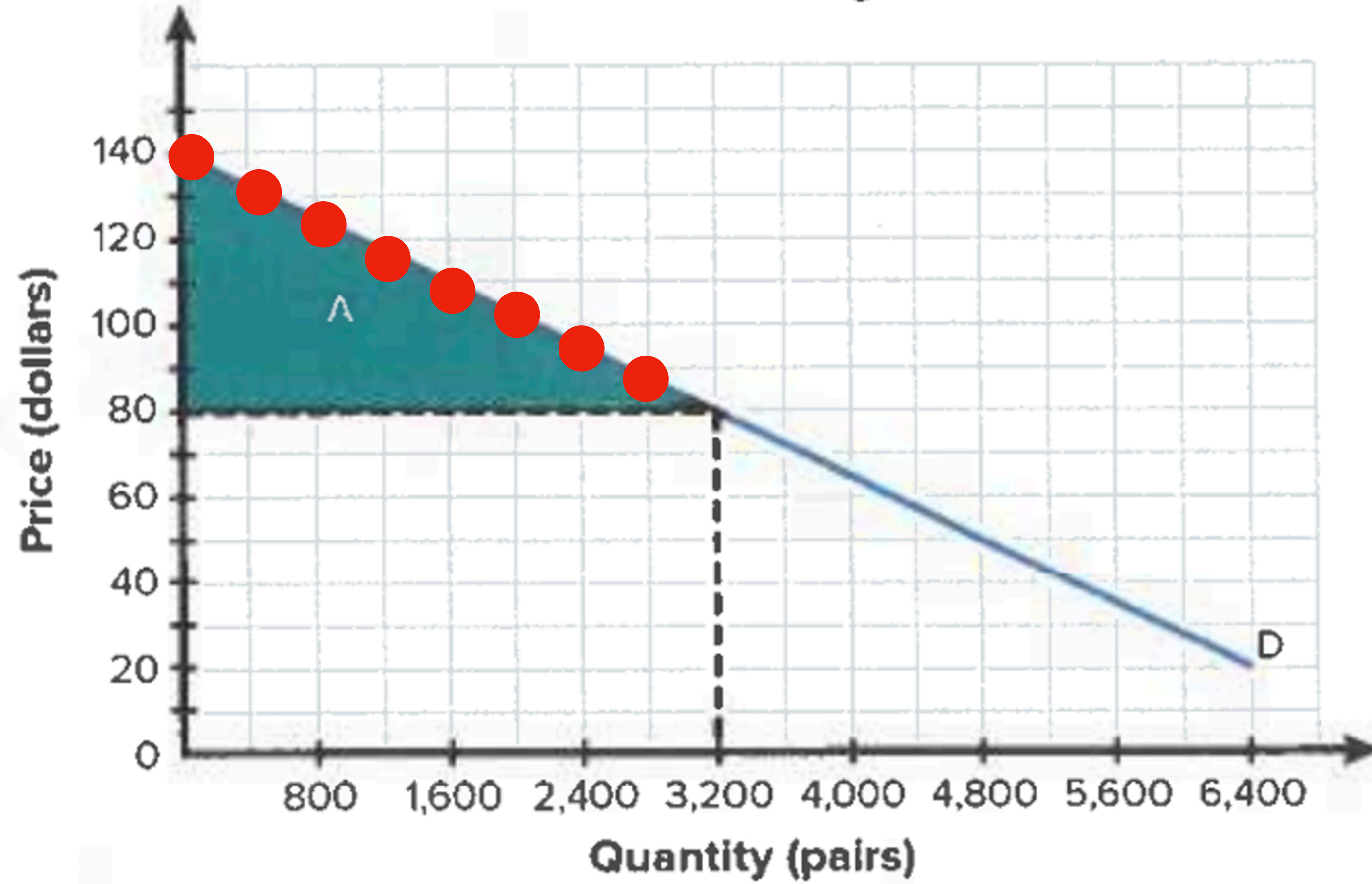
Demand for Sunglasses



Demand for Sunglasses



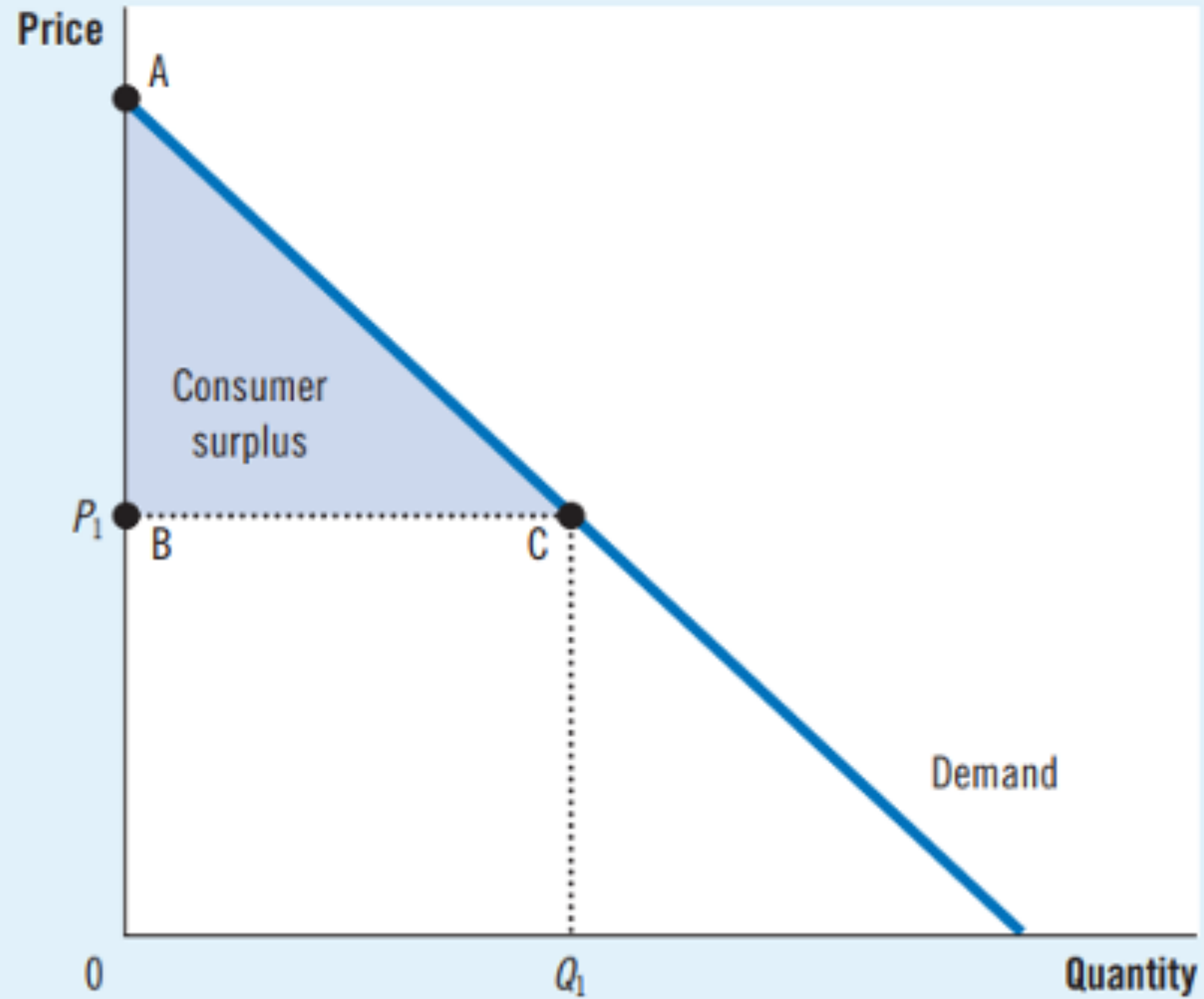
### Demand for Sunglasses



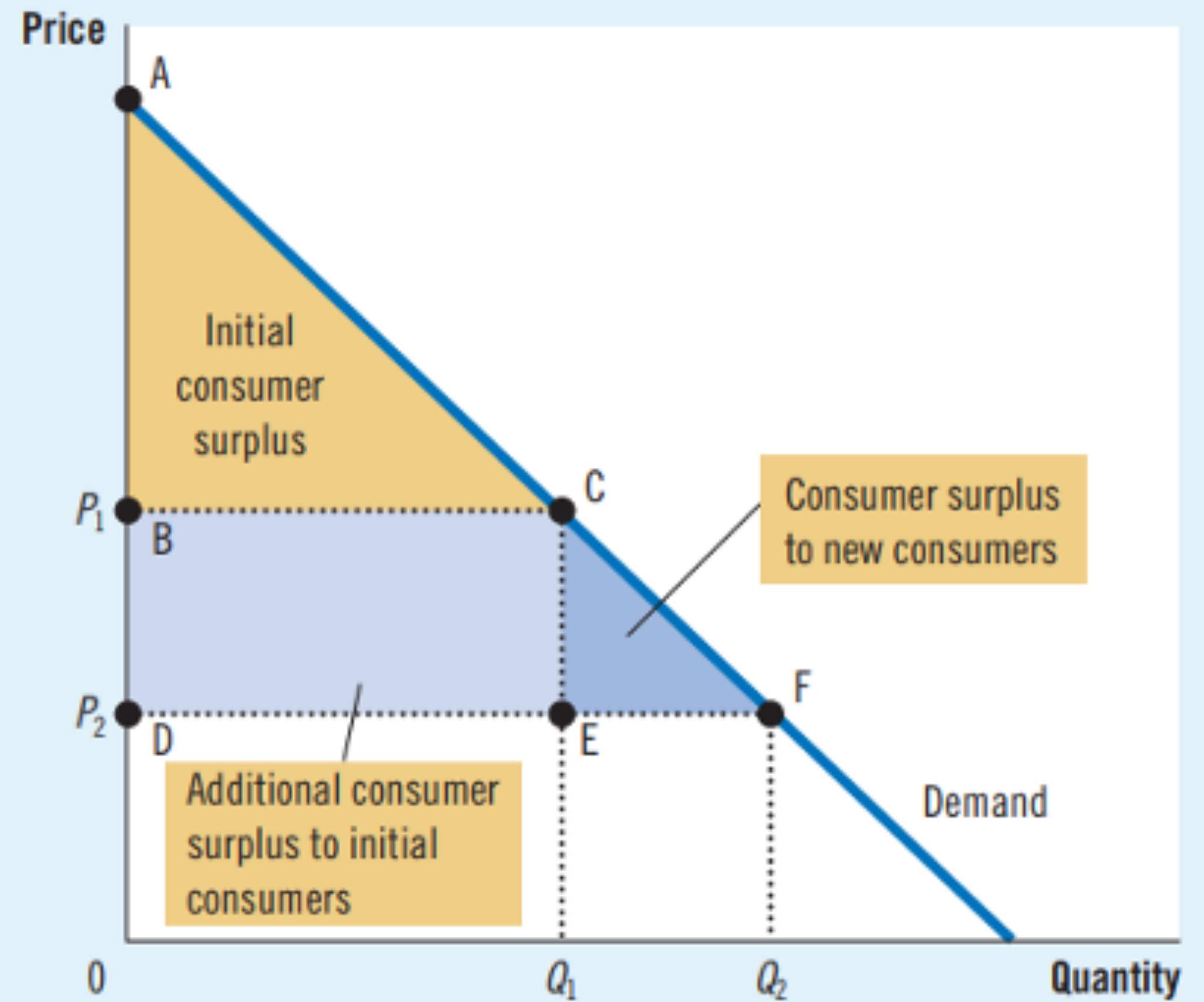
# Consumer Surplus

- A lower price increases consumer surplus on the market.
- There are two types of increases in consumer surplus from a lower price.
  - Increased surplus to old consumers.
  - Increased surplus to new consumers.

(a) Consumer Surplus at Price  $P_1$



(b) Consumer Surplus at Price  $P_2$

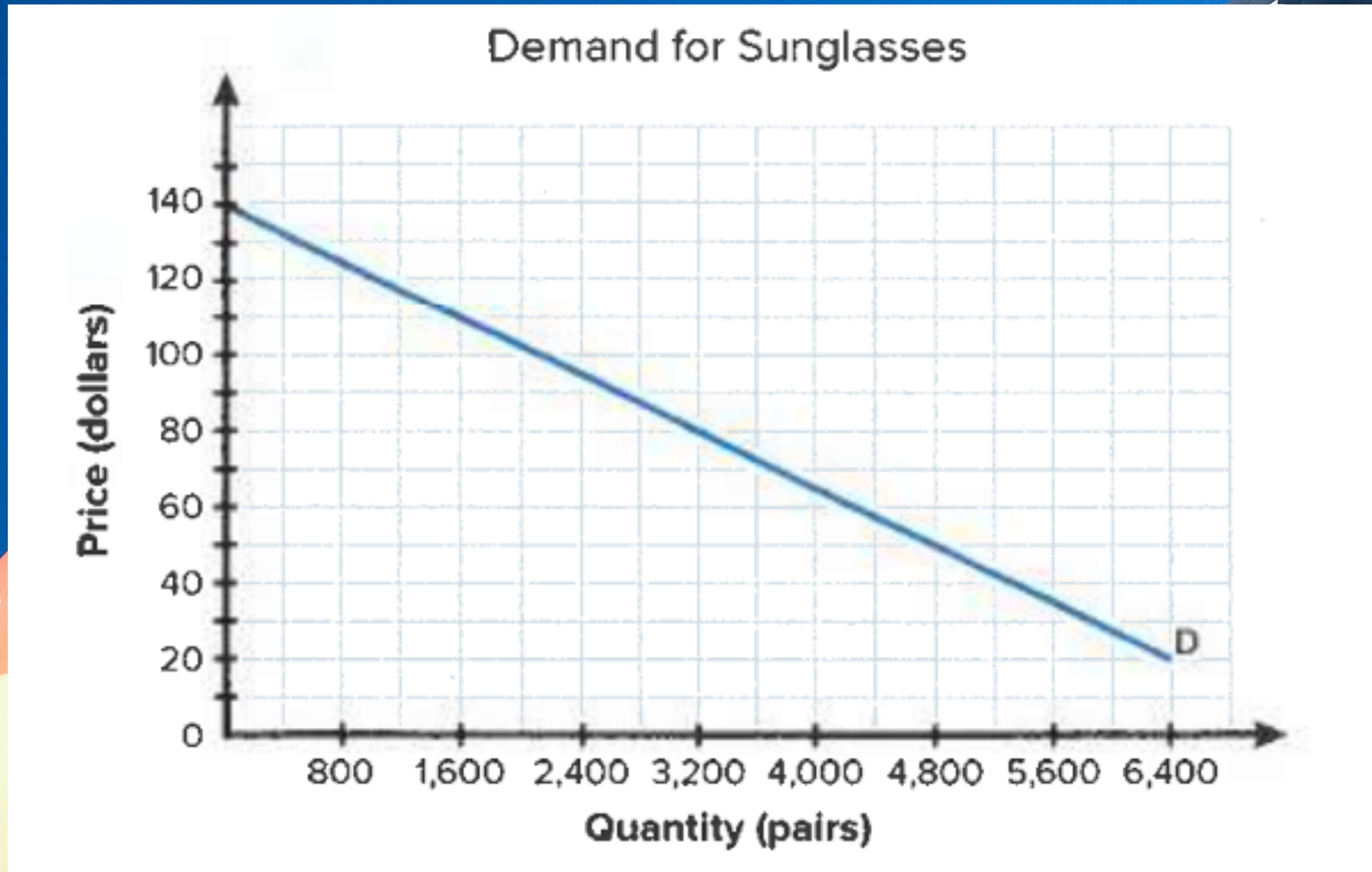


# Calculating Consumer Surplus

- The Area of a Triangle:

$$\frac{1}{2} \textit{base} * \textit{height}$$

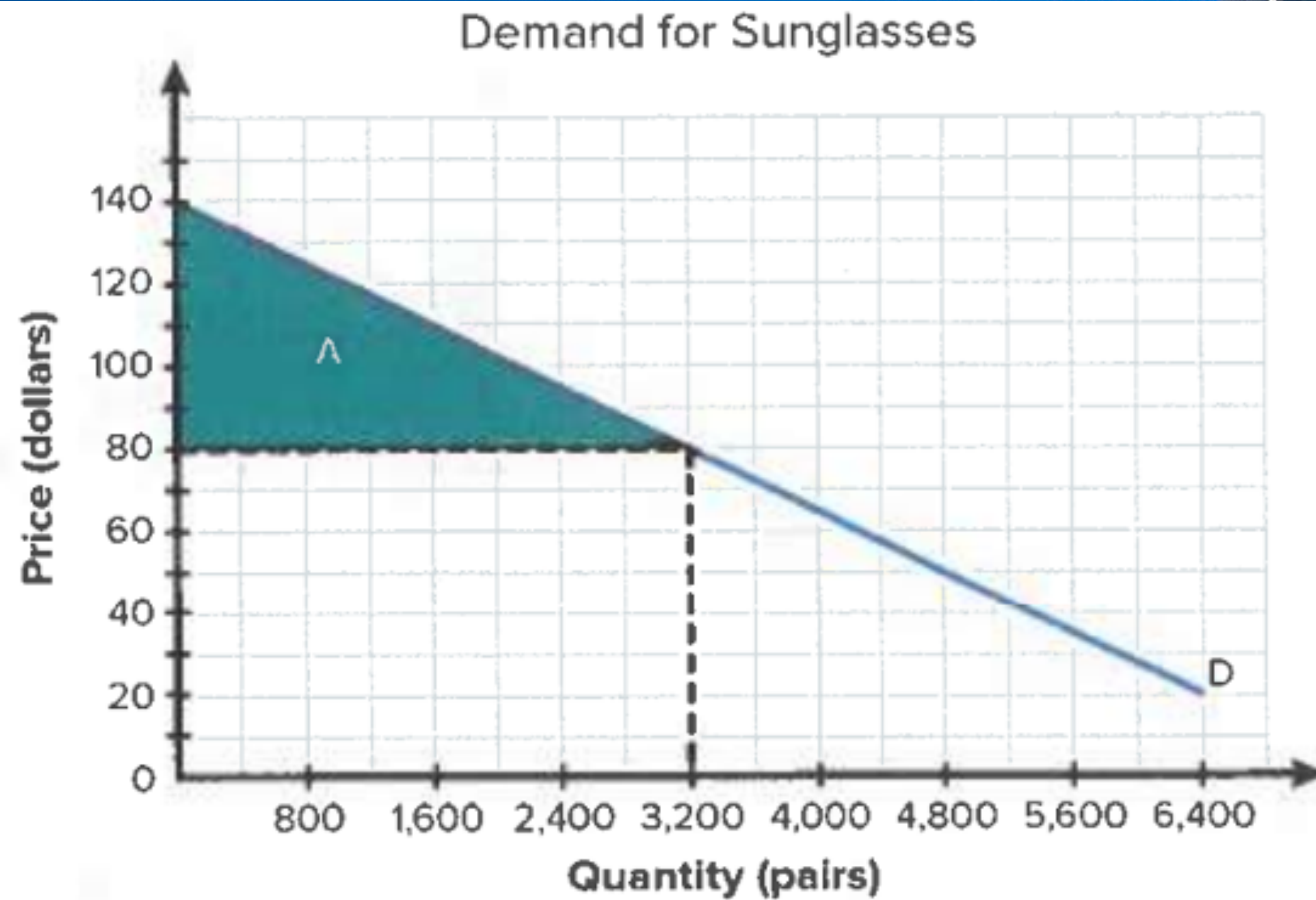
# Example: Sunglasses



What is the consumer surplus for sunglasses when the price is \$80 per pair?

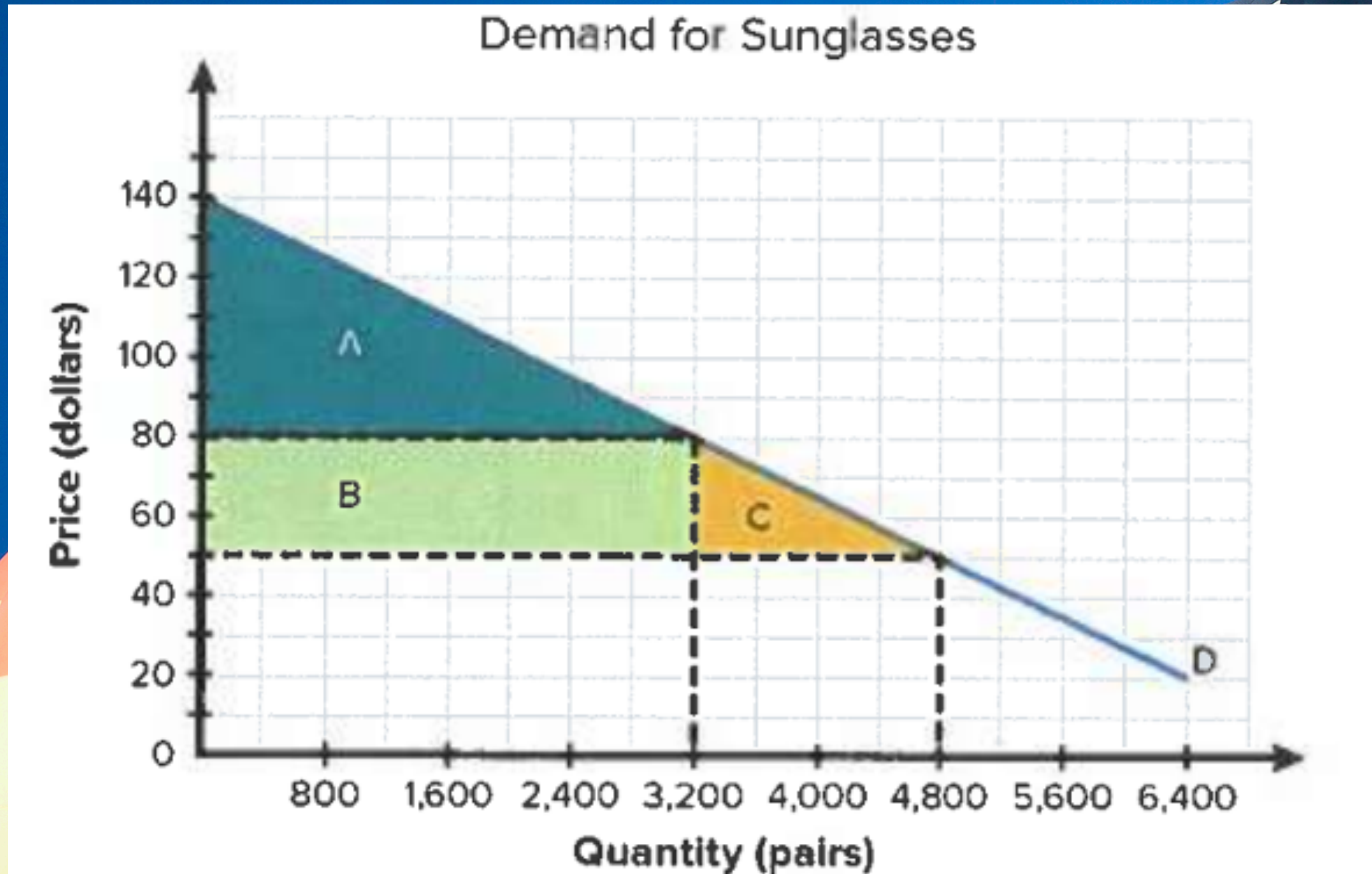


# Example: Sunglasses



What is the consumer surplus if the price falls to \$50 per pair? How much CS is for existing consumers, & how much CS is for new consumers?

# Example: Sunglasses



2. Calculate the areas:

$$(3200) * (80 - 50)$$

$$(3200) * (30)$$

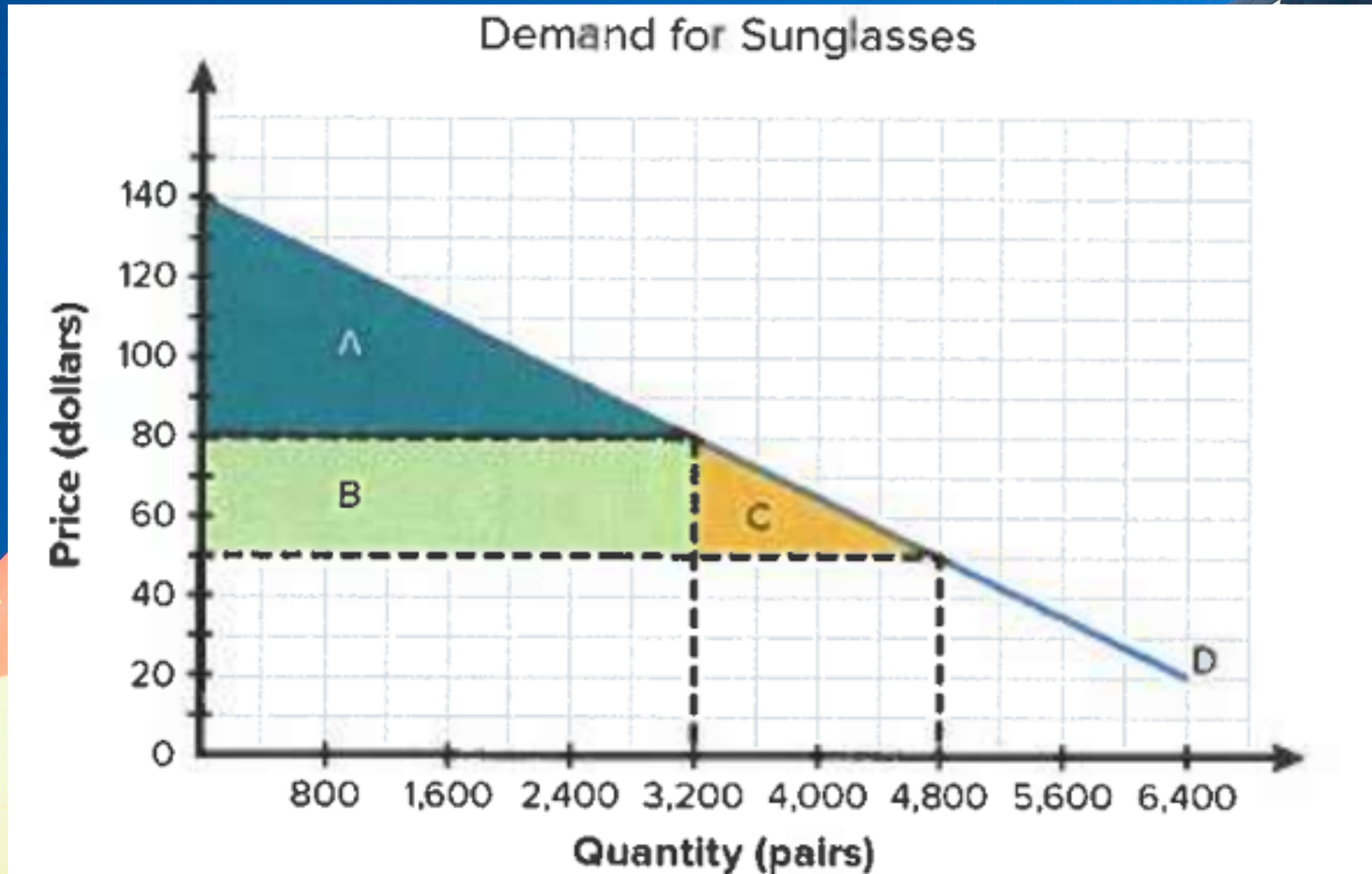
CS for Area B = \$96,000

$$\frac{1}{2}(4800 - 3200) * (80 - 50)$$

$$\frac{1}{2}(1600) * (30)$$

CS for Area C = \$24,000

# Example: Sunglasses



3. Sum the areas:

CS for Area A = \$96,000

CS for Area B = \$96,000

CS for Area C = \$24,000

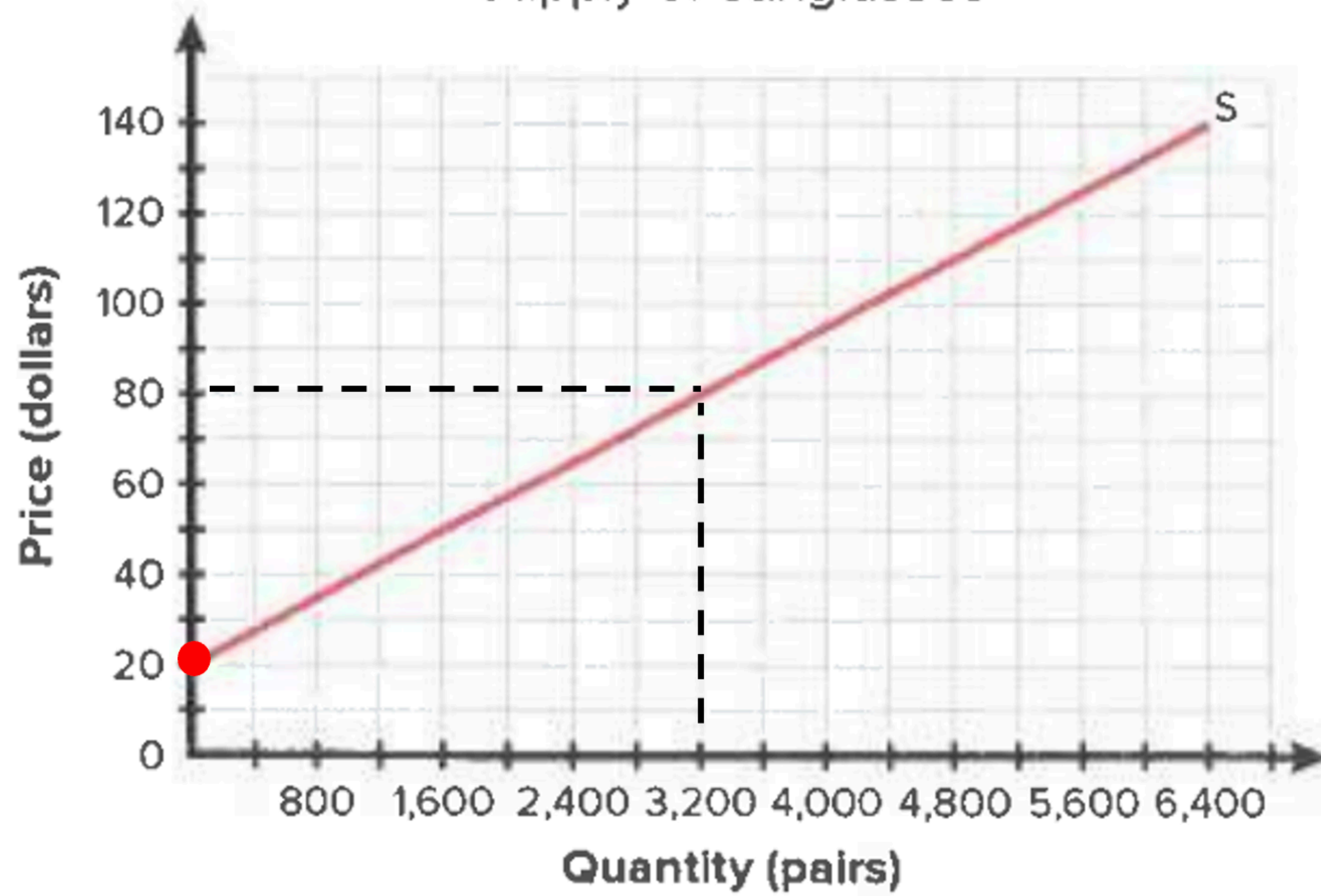
CS = \$216,000

# Consumer Surplus

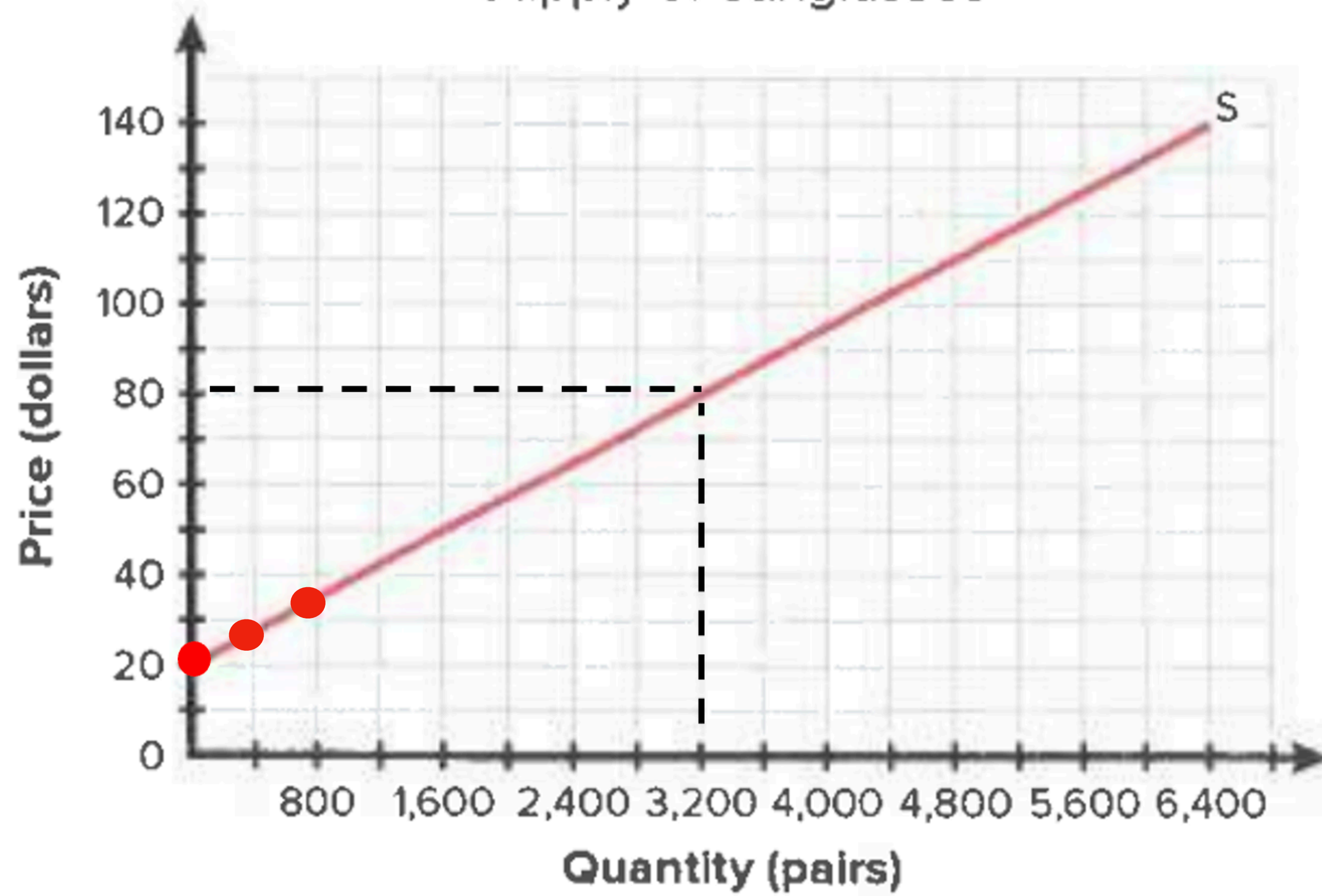
- Economists use consumer surplus as a way of measuring the welfare of consumers in a market economy.

**Producer surplus**

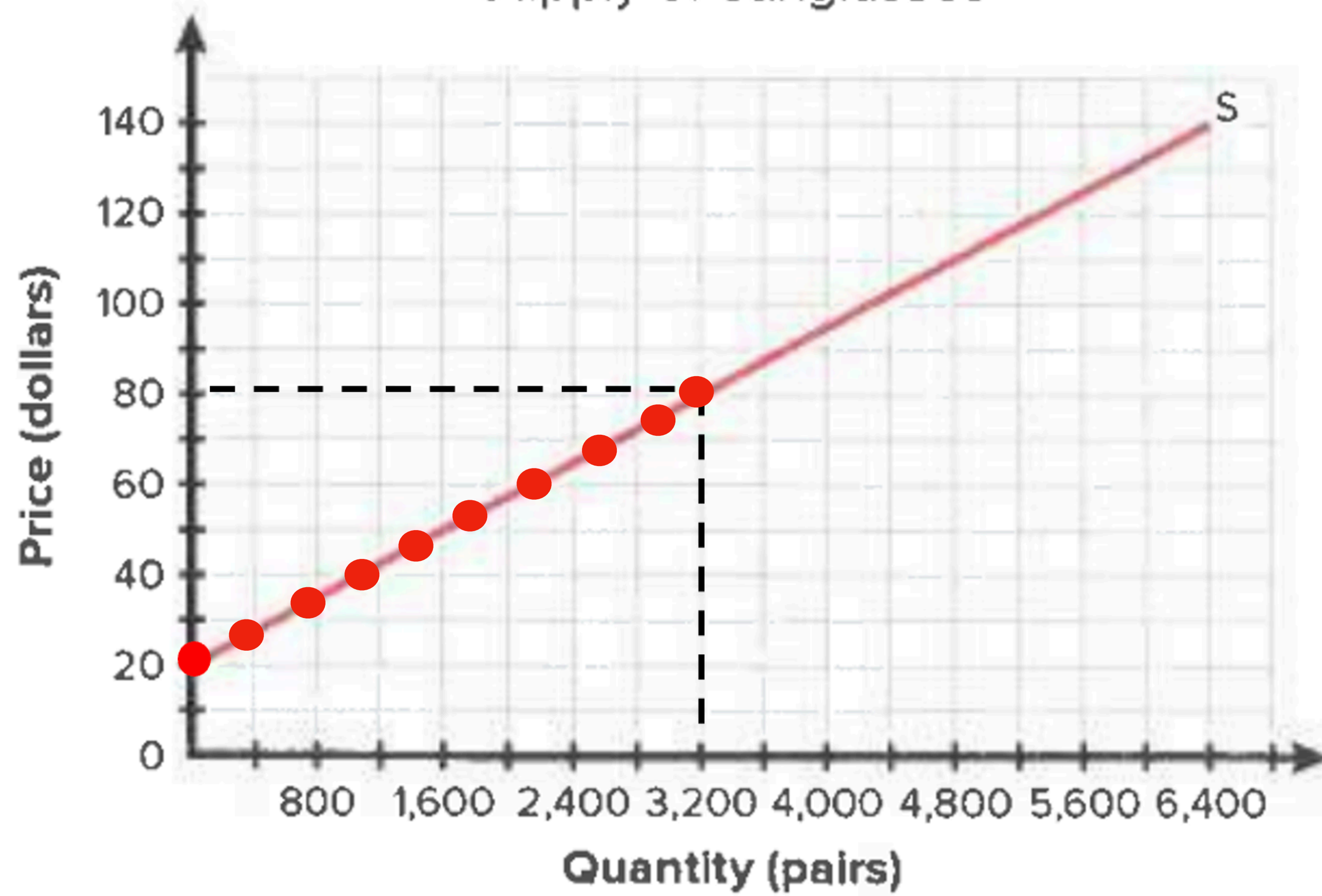
### Supply of Sunglasses



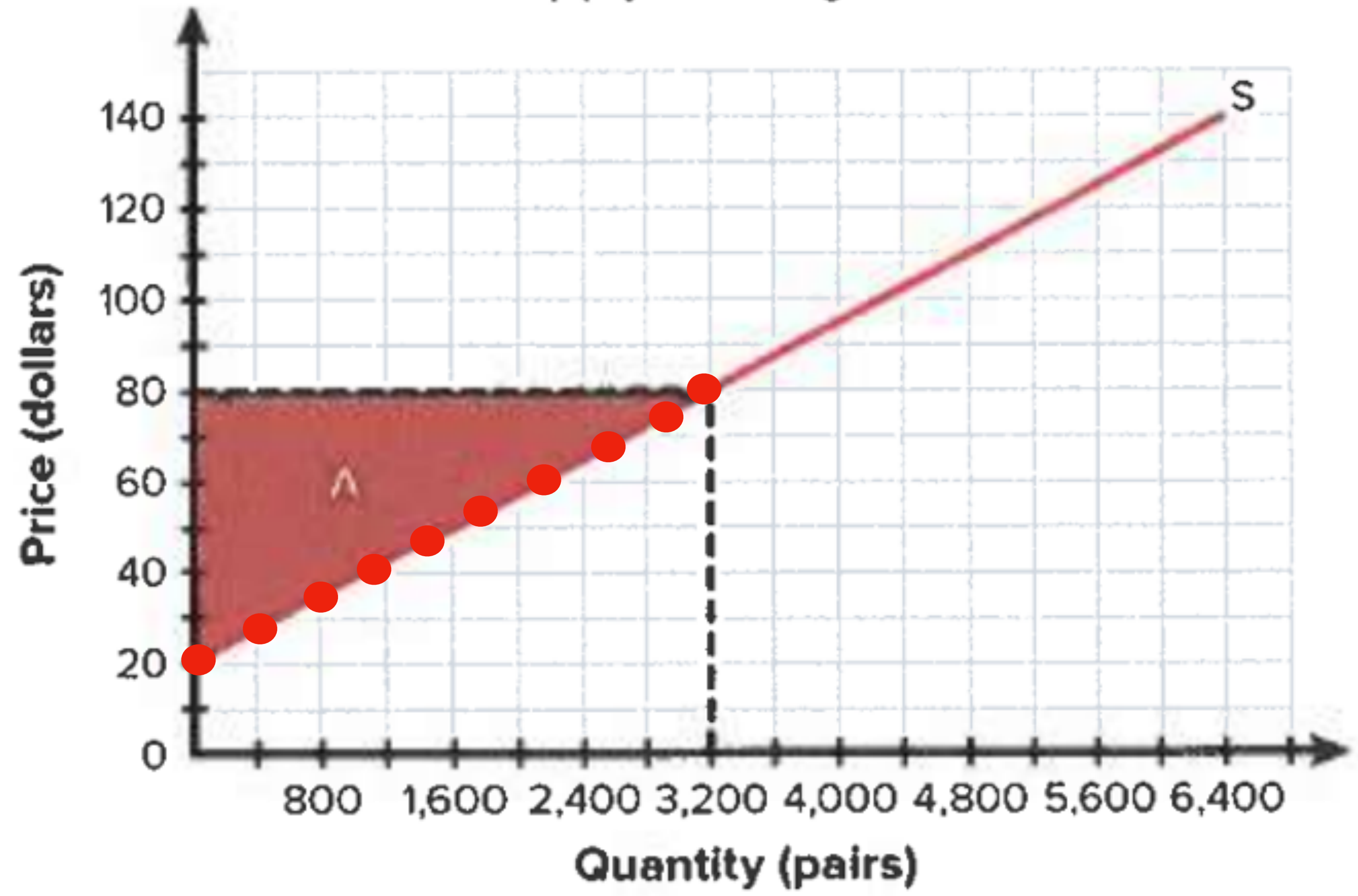
### Supply of Sunglasses



## Supply of Sunglasses



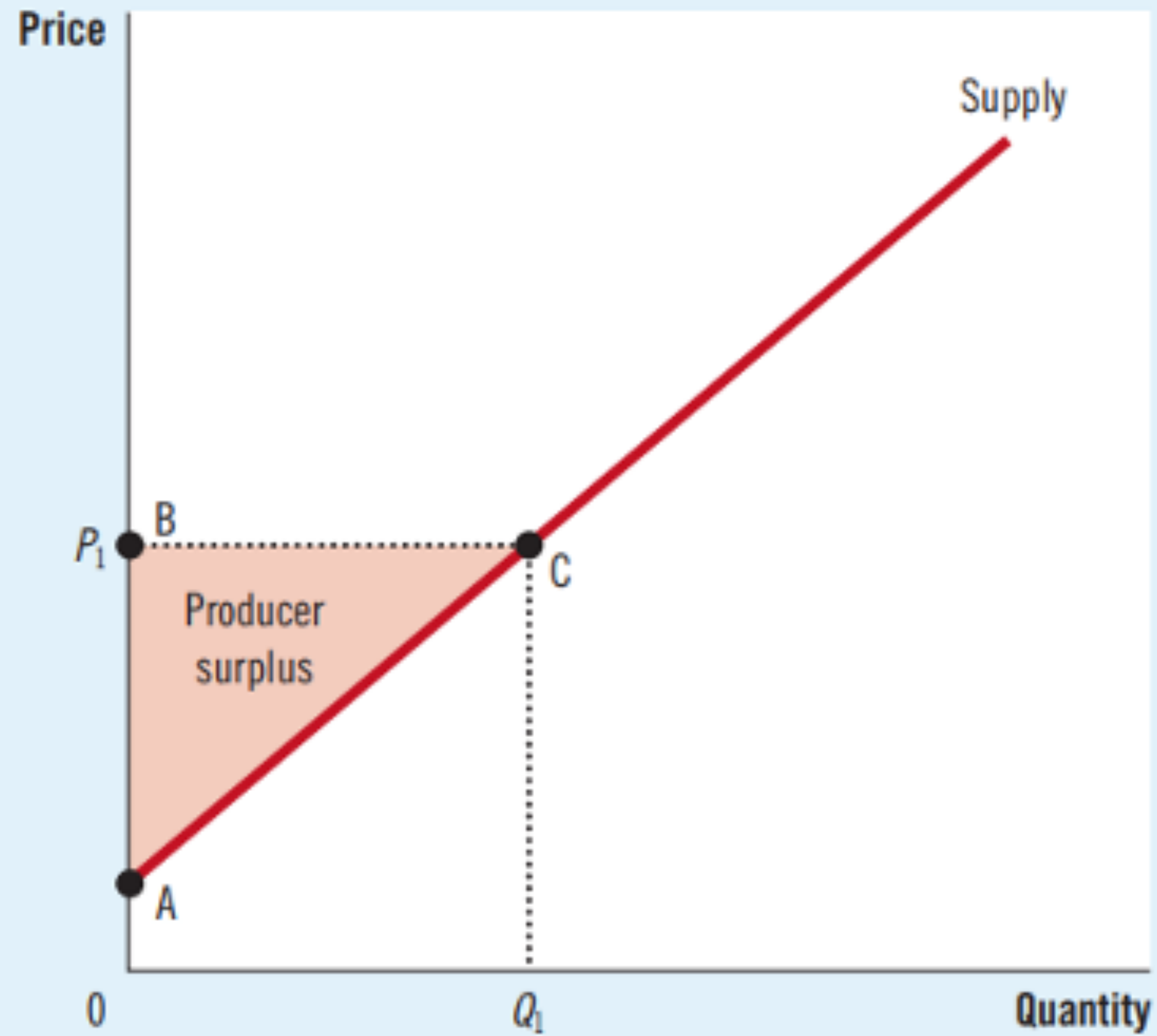
### Supply of Sunglasses



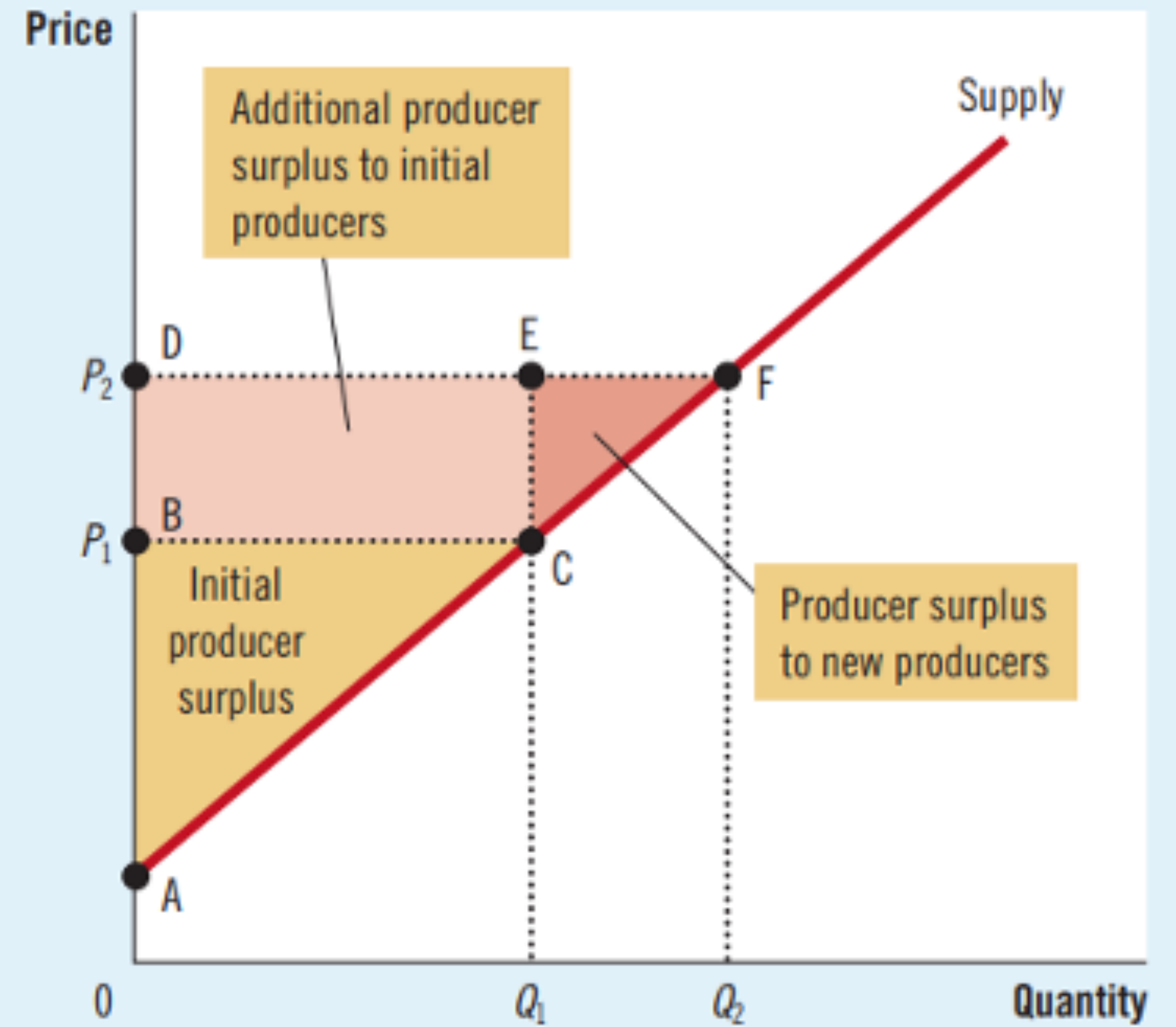
# Producer Surplus

- A higher price increases producer surplus on the market.
- There are two types of increases in producer surplus from a lower price.
  - Increased surplus to old producers.
  - Increased surplus to new producers.

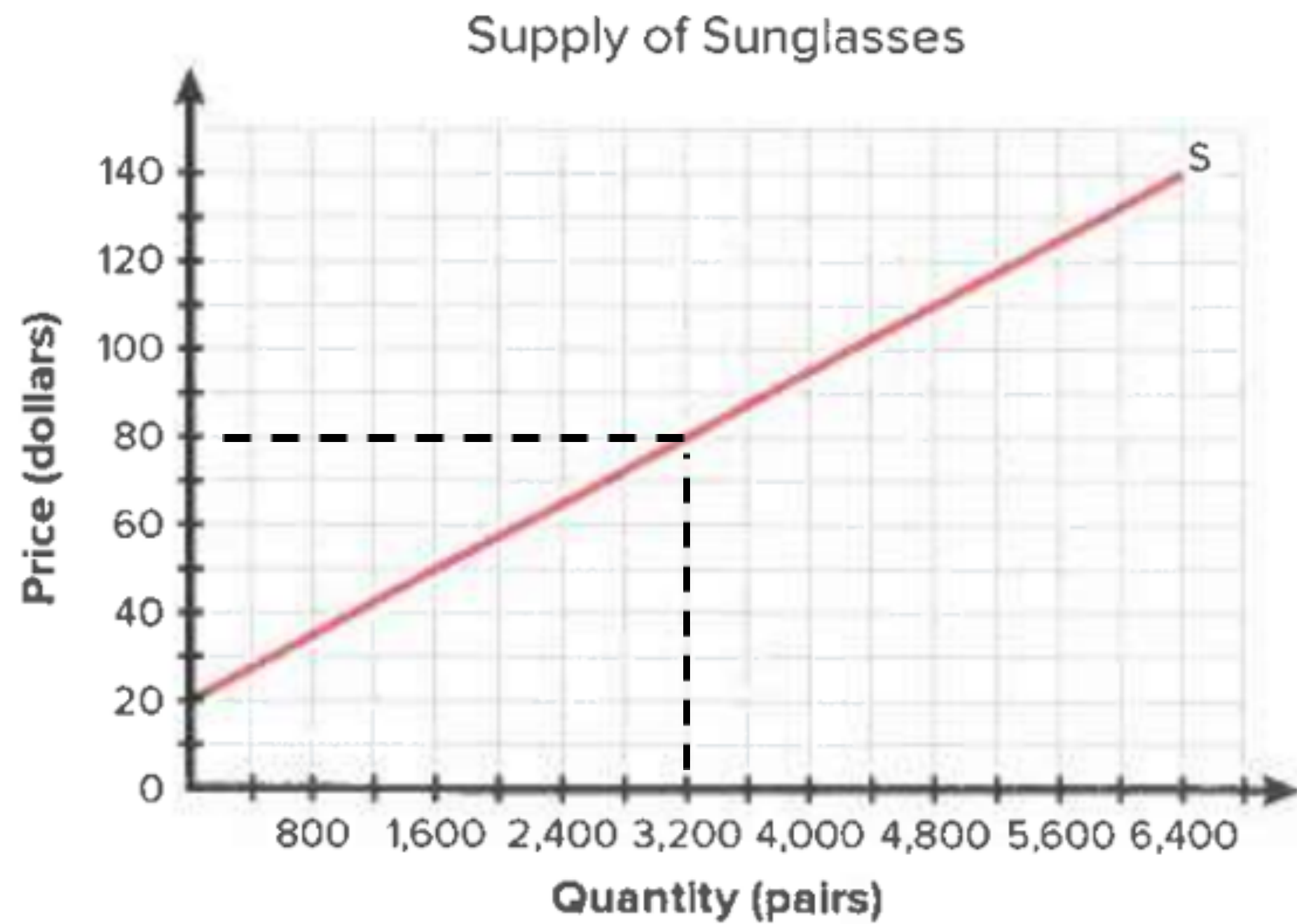
(a) Producer Surplus at Price  $P_1$



(b) Producer Surplus at Price  $P_2$

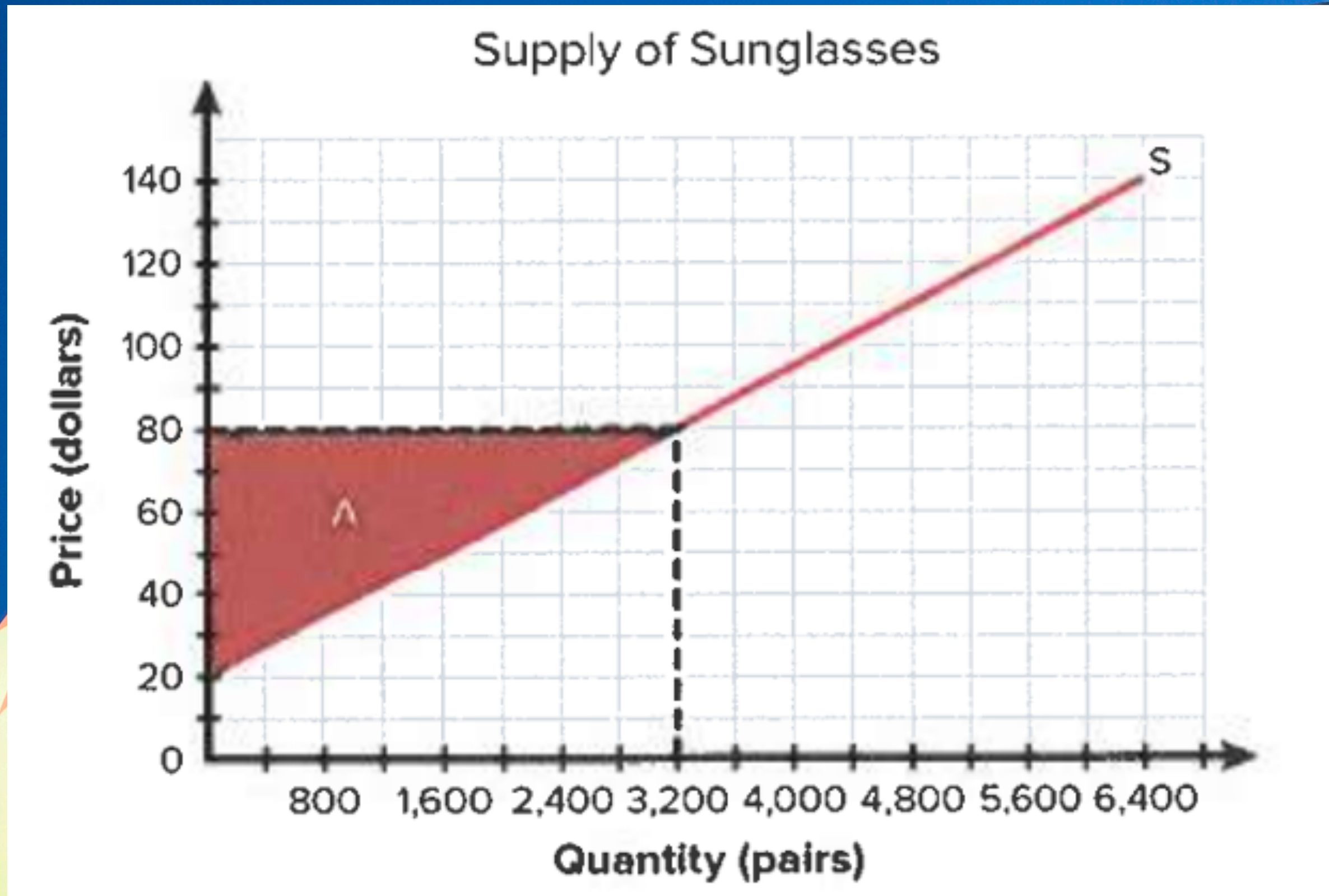


## Example: Sunglasses

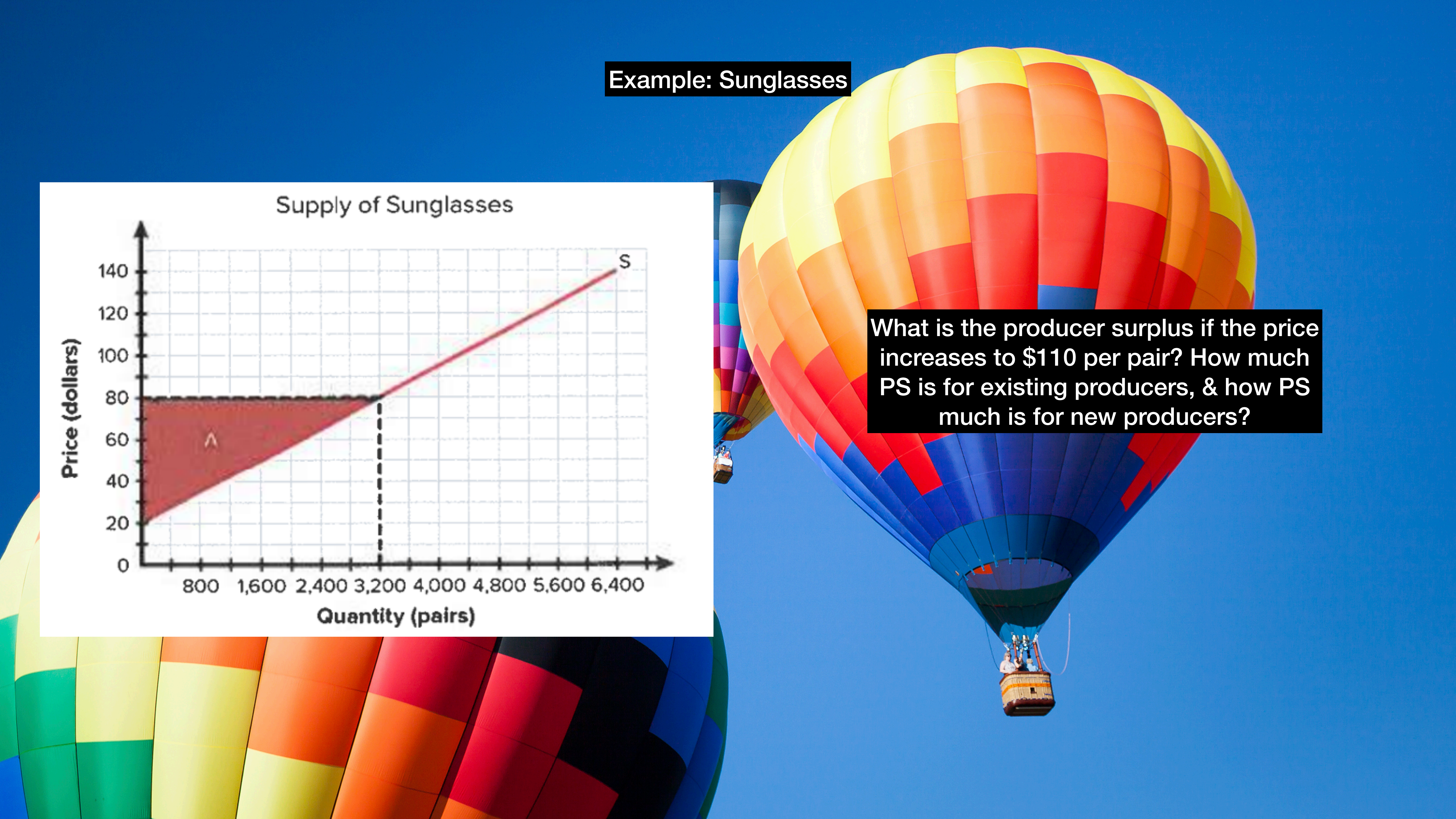


What is the producer surplus for sunglasses when the price is \$80 per pair?

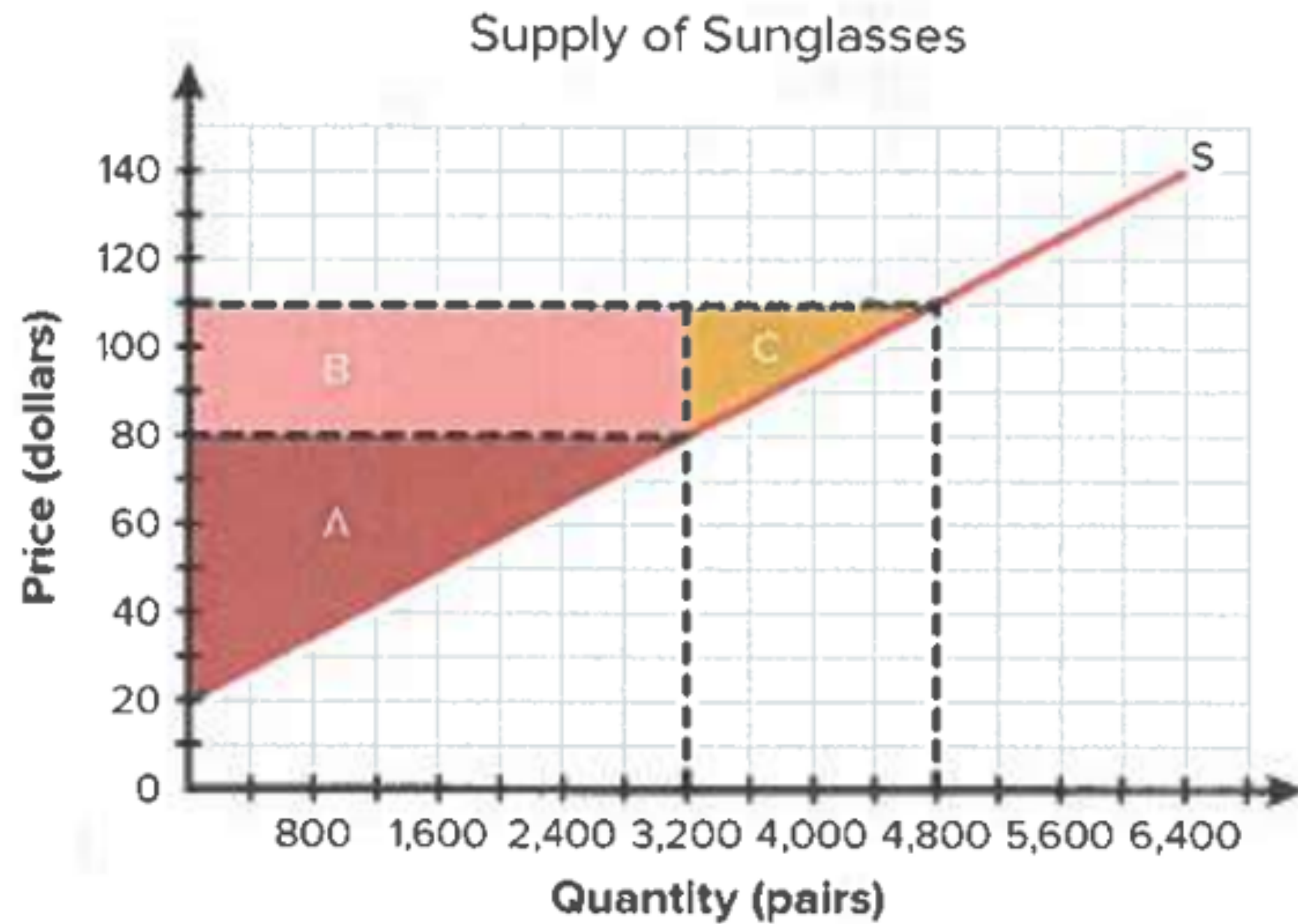
# Example: Sunglasses



What is the producer surplus if the price increases to \$110 per pair? How much PS is for existing producers, & how PS much is for new producers?



## Example: Sunglasses



2. Calculate the areas:

$$(3200) * (110 - 80)$$

$$(3200) * (30)$$

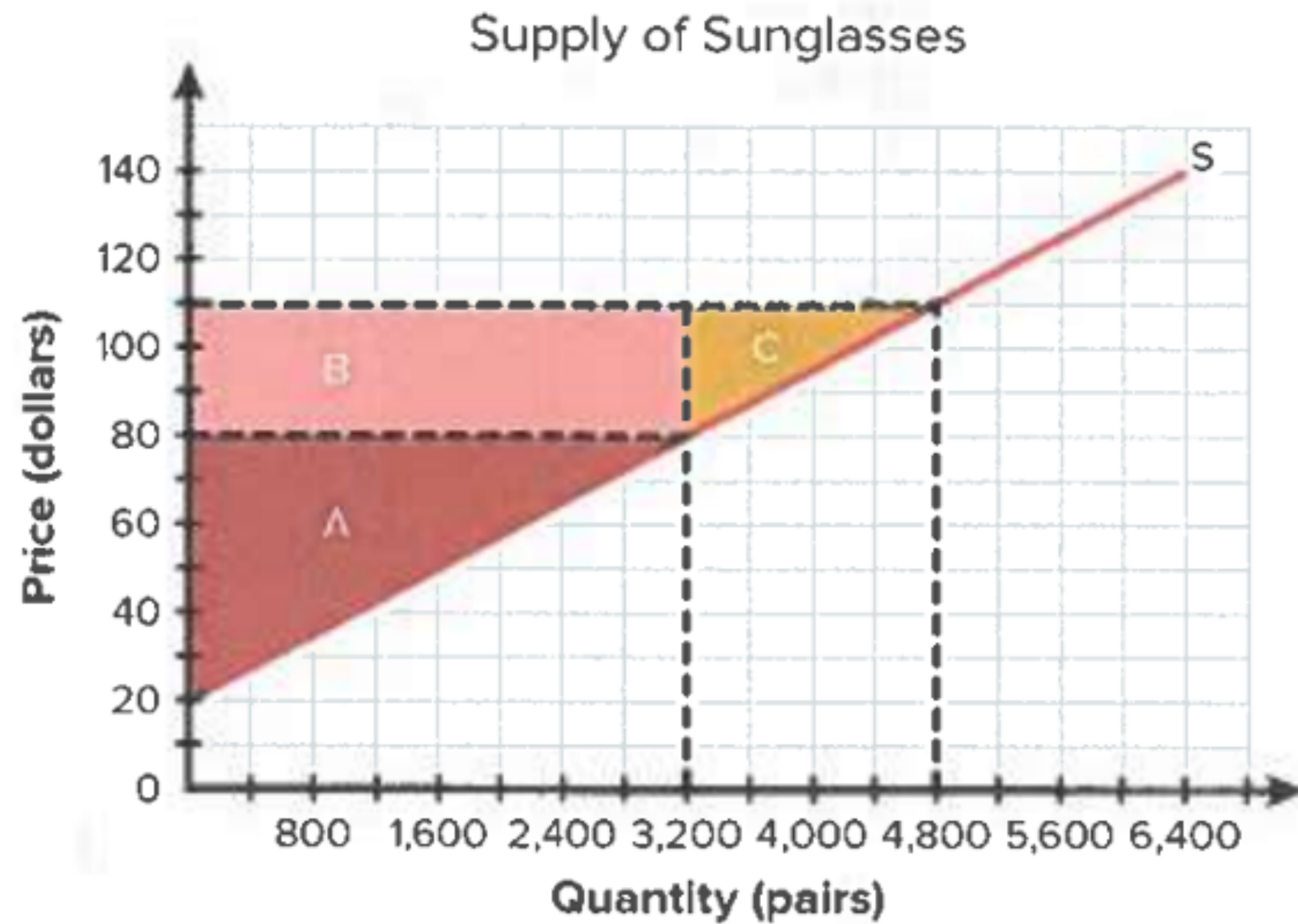
**PS for Area B = \$96,000**

$$\frac{1}{2}(4800 - 3200) * (110 - 80)$$

$$\frac{1}{2}(1600) * (30)$$

**CS for Area C = \$24,000**

## Example: Sunglasses



3. Sum the areas:

PS for Area A = \$96,000

PS for Area B = \$96,000

PS for Area C = \$24,000

**PS = \$216,000**

# Producer Surplus

- Economists use producer surplus as a way of measuring the welfare of producers in a market economy.

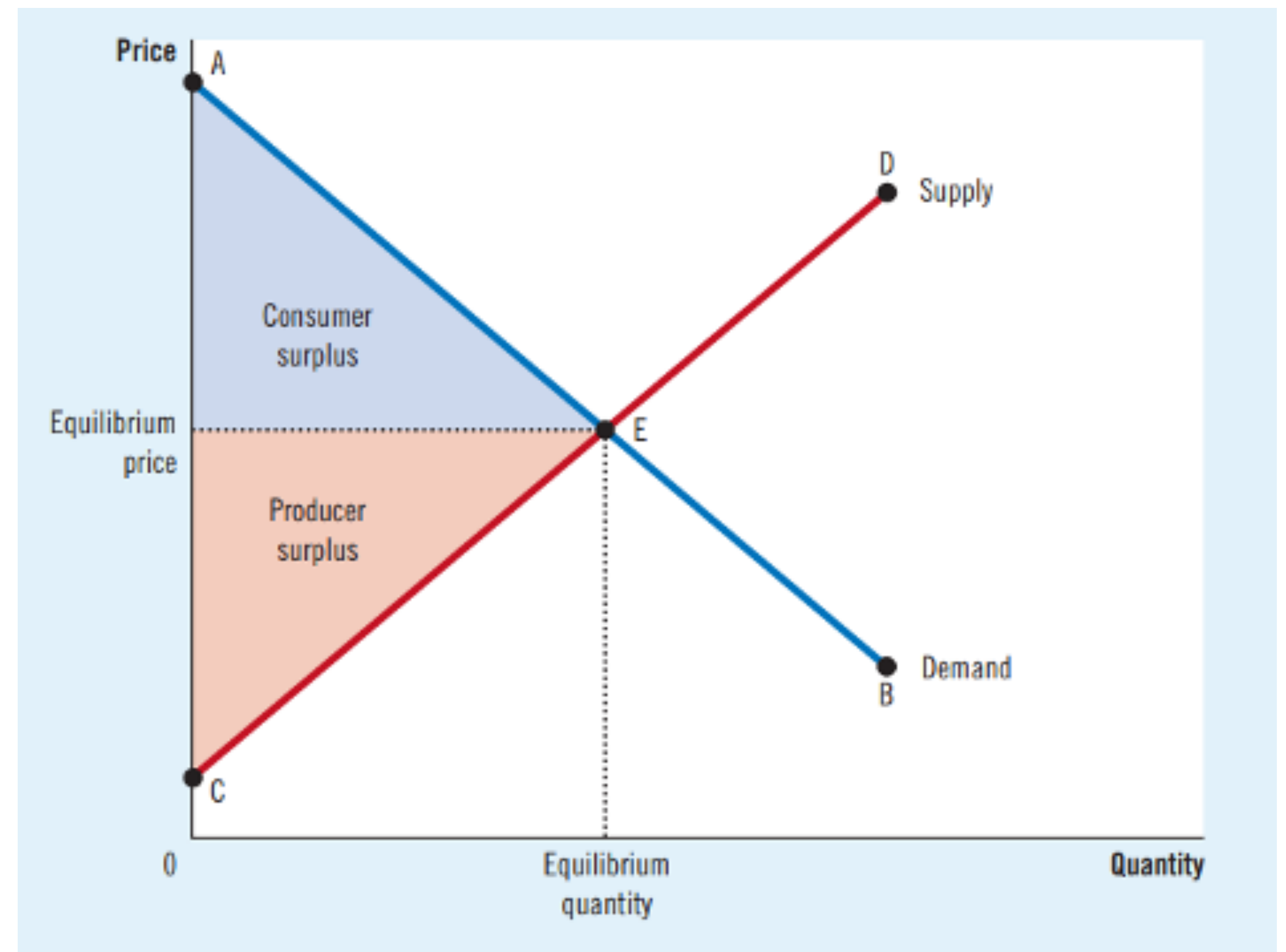
**Total Surplus**

# Total (Economic) Surplus

- The sum of consumer & producer surplus.
  - Total Surplus = Consumer Surplus + Producer Surplus
- A measure of the total welfare that trade creates for consumers & producers in the market.

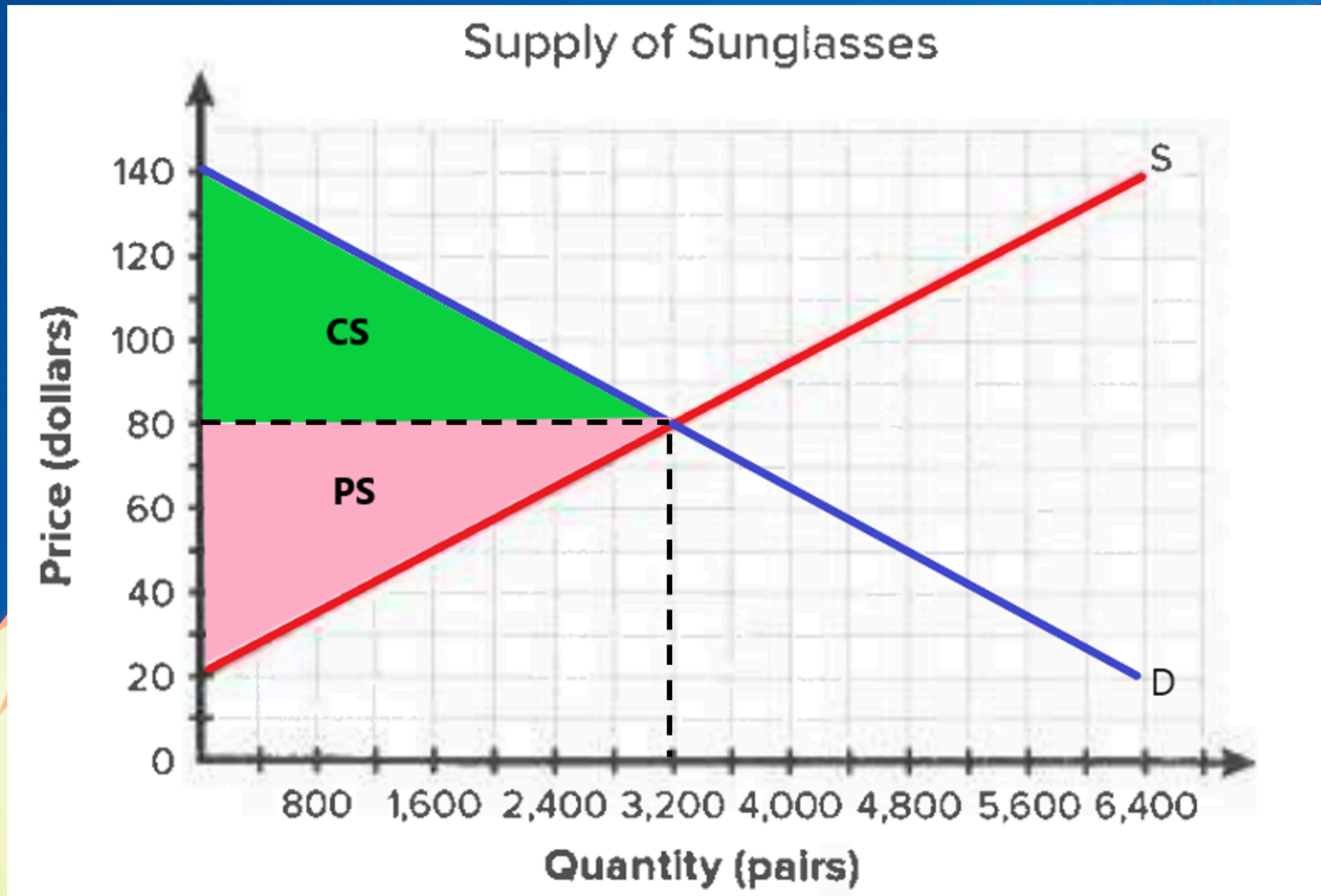
# Total (Economic) Surplus

- Graphically, total surplus is the sum of the areas of consumer & producer surplus.
- At the equilibrium price & quantity, **total surplus is maximized**. The market is **efficient**.





## Example: Sunglasses



$$TS = CS + PS$$

$$CS = \$96,000$$

$$PS = \$96,000$$

$$TS = \$96,000 + \$96,000$$

$$TS = \$192,000$$

# Total Surplus

- Economists use total surplus as a way of measuring the welfare of economic actors in a market economy.

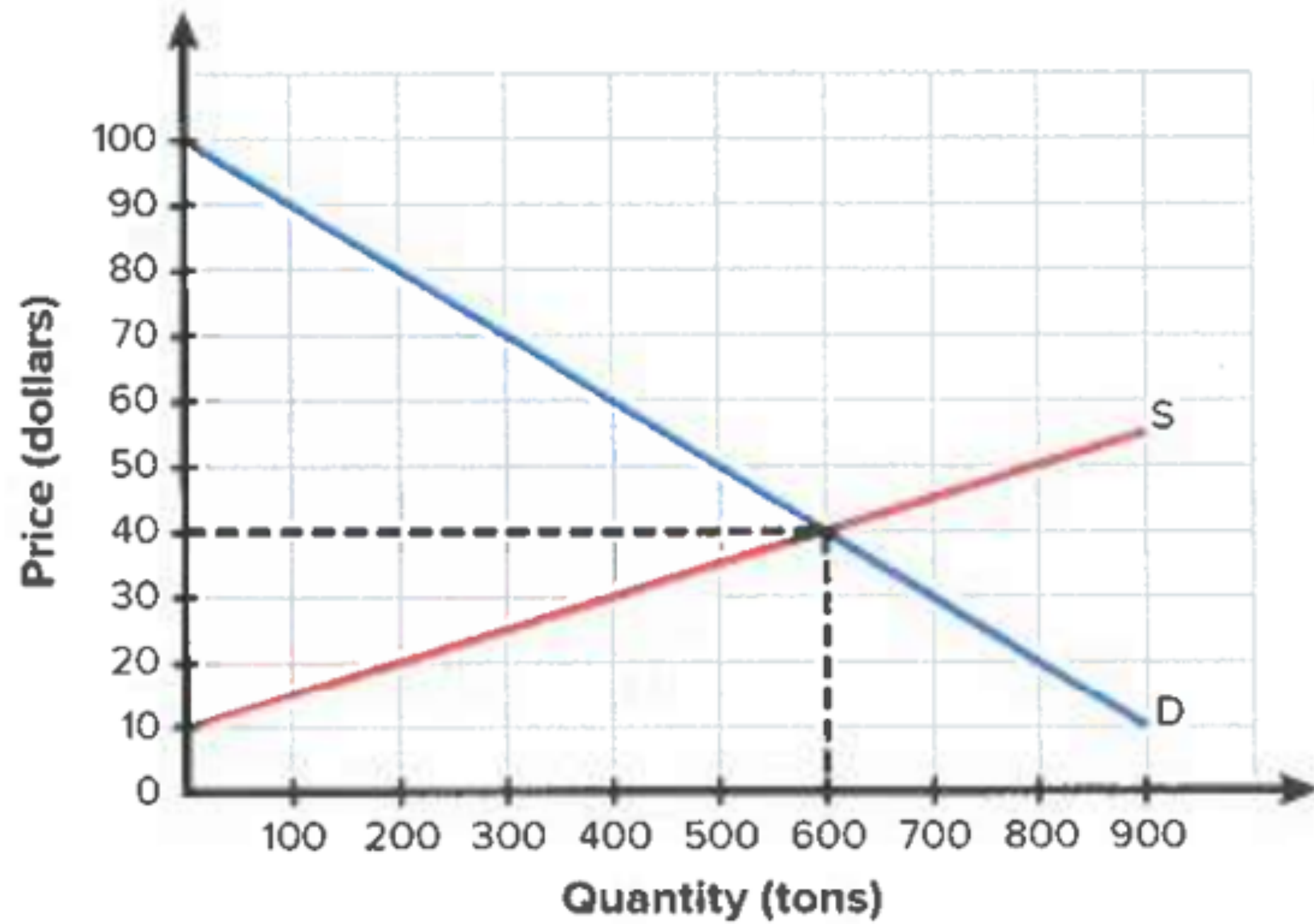
**Deadweight loss**

# Deadweight Loss

- The value of total (economic) surplus foregone when a market is not allowed to adjust toward its competitive equilibrium.

## Example: Coal

Market for Coal

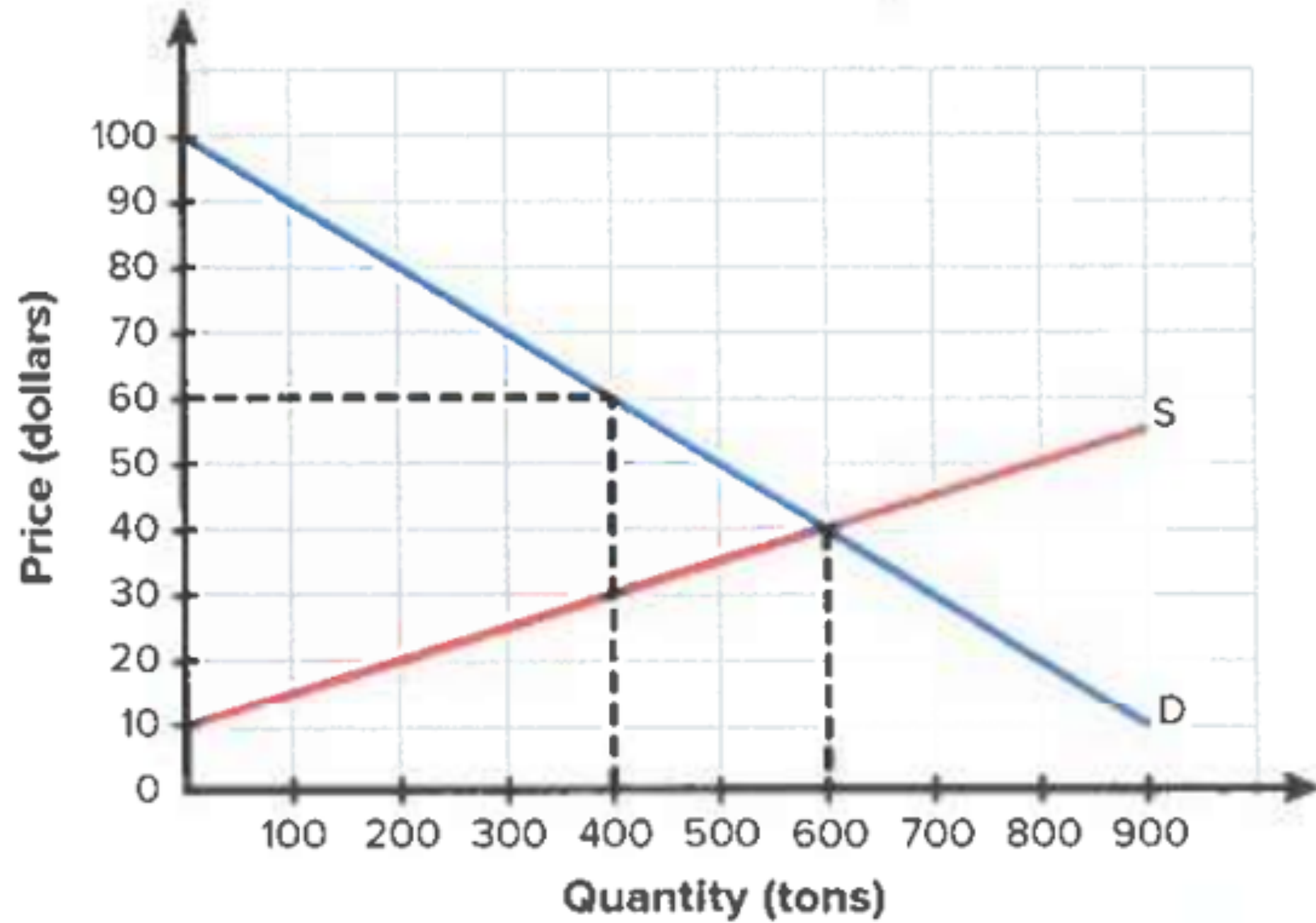


The equilibrium price & quantity for the coal market are \$40 & 600 tons, respectively.

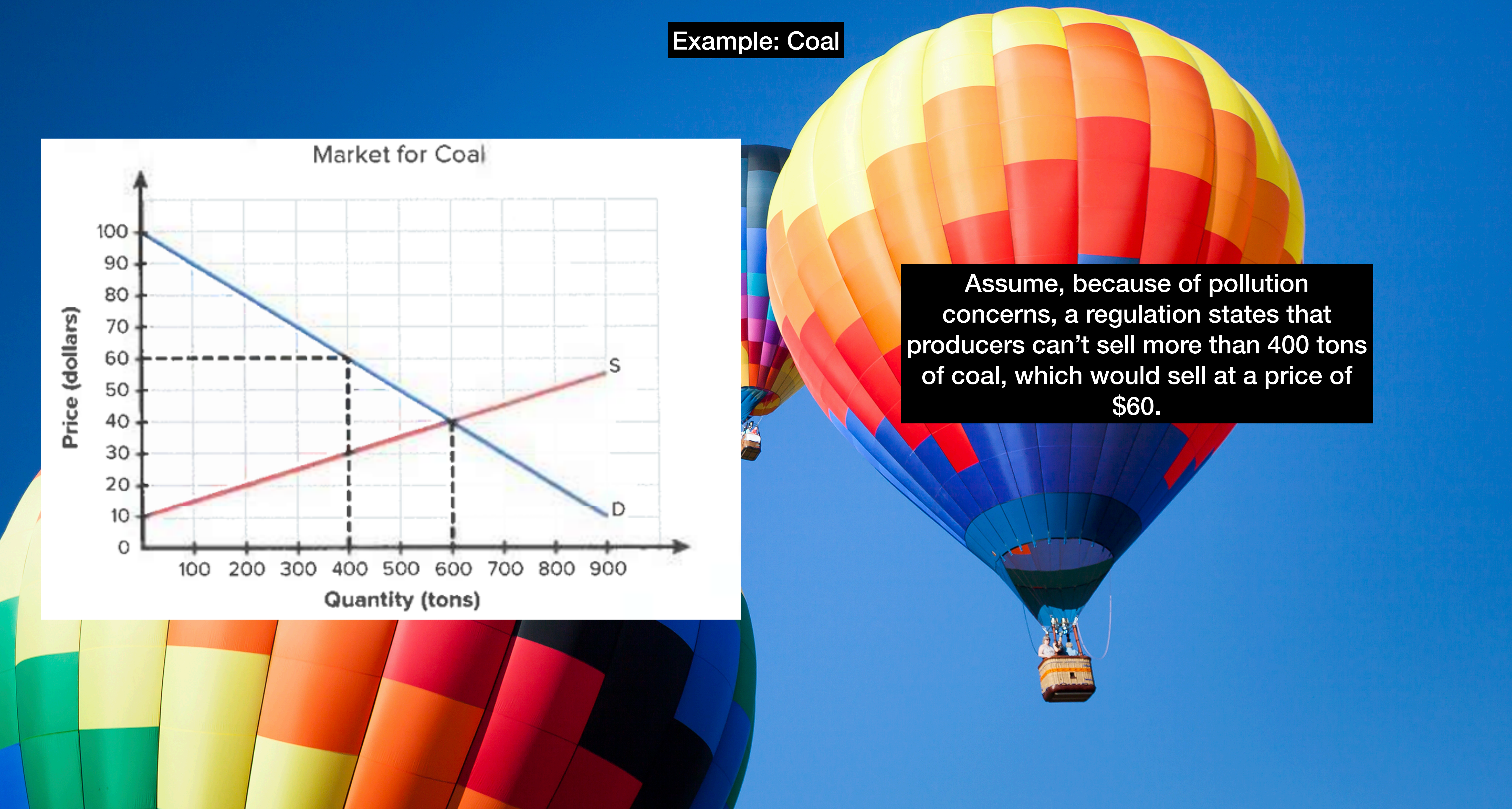


## Example: Coal

Market for Coal

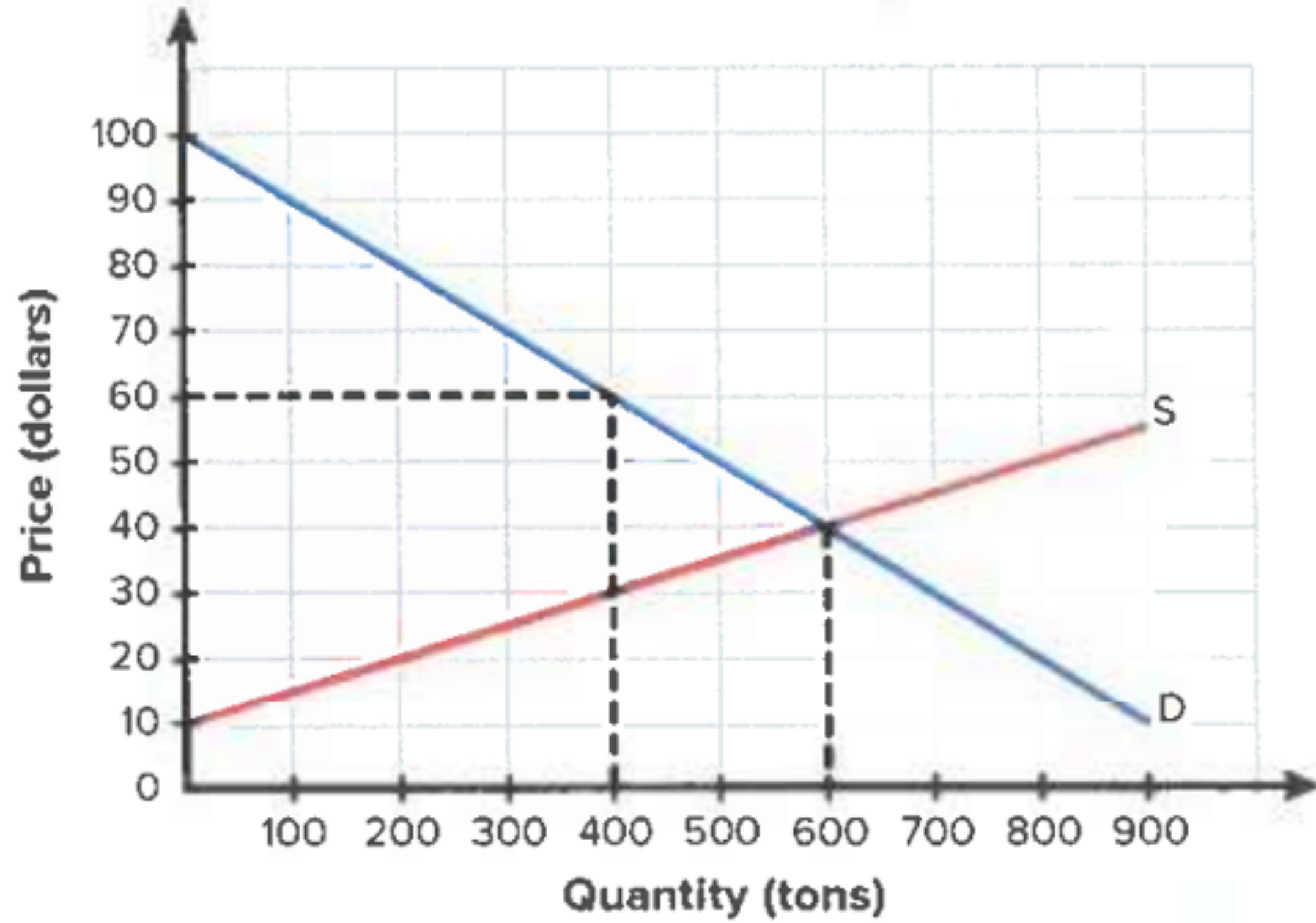


Assume, because of pollution concerns, a regulation states that producers can't sell more than 400 tons of coal, which would sell at a price of \$60.

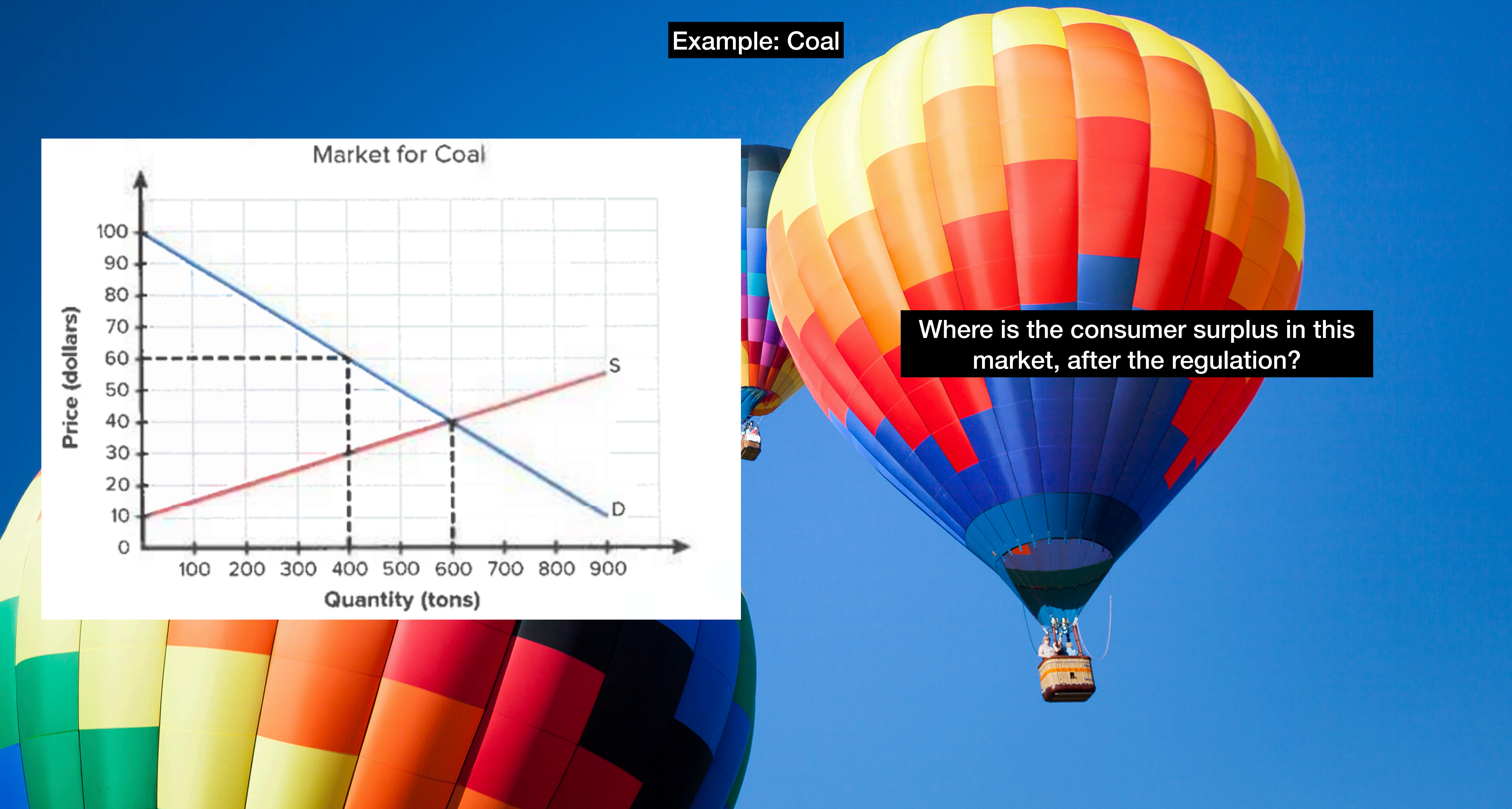


## Example: Coal

Market for Coal

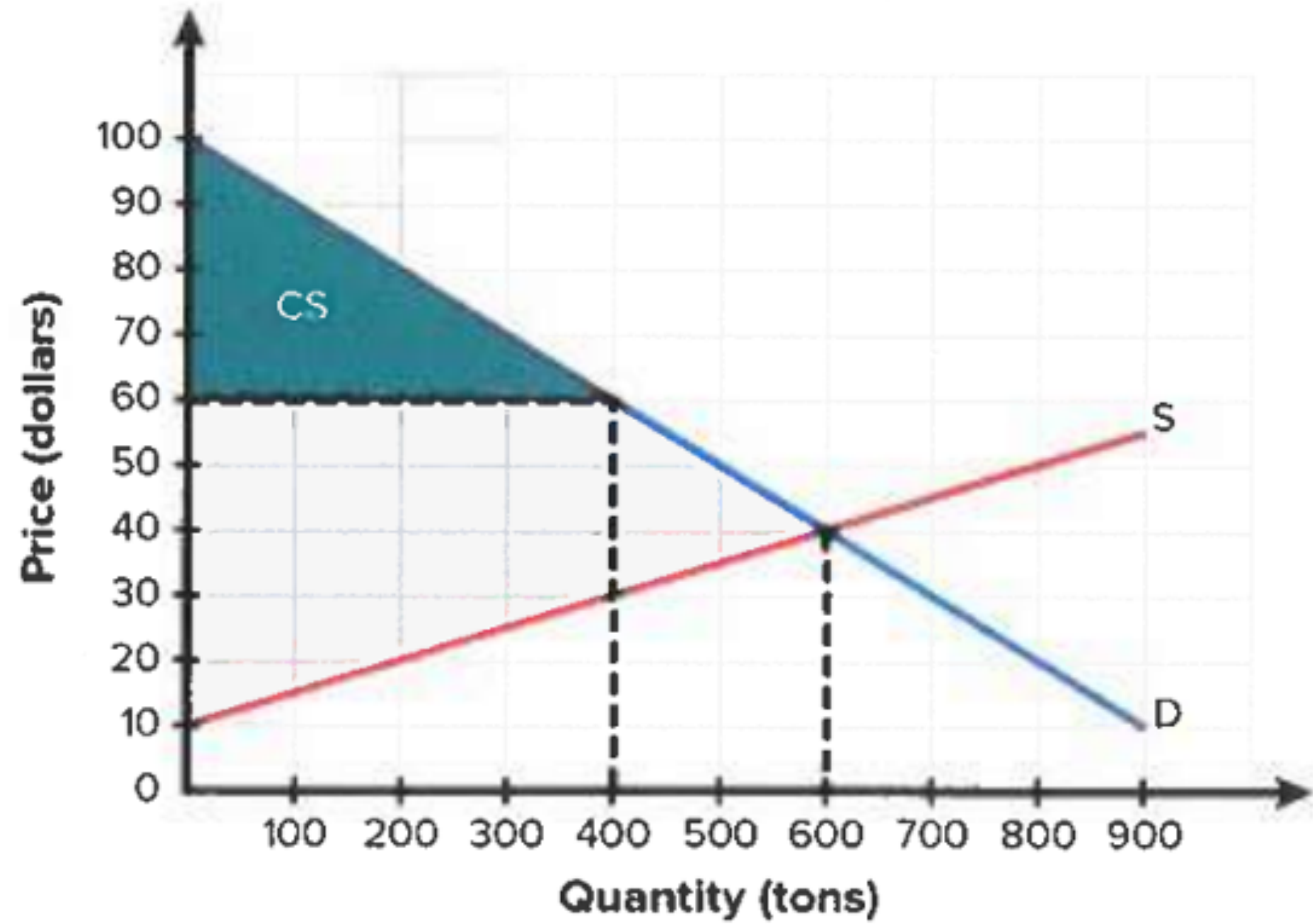


Where is the consumer surplus in this market, after the regulation?



## Example: Coal

Market for Coal

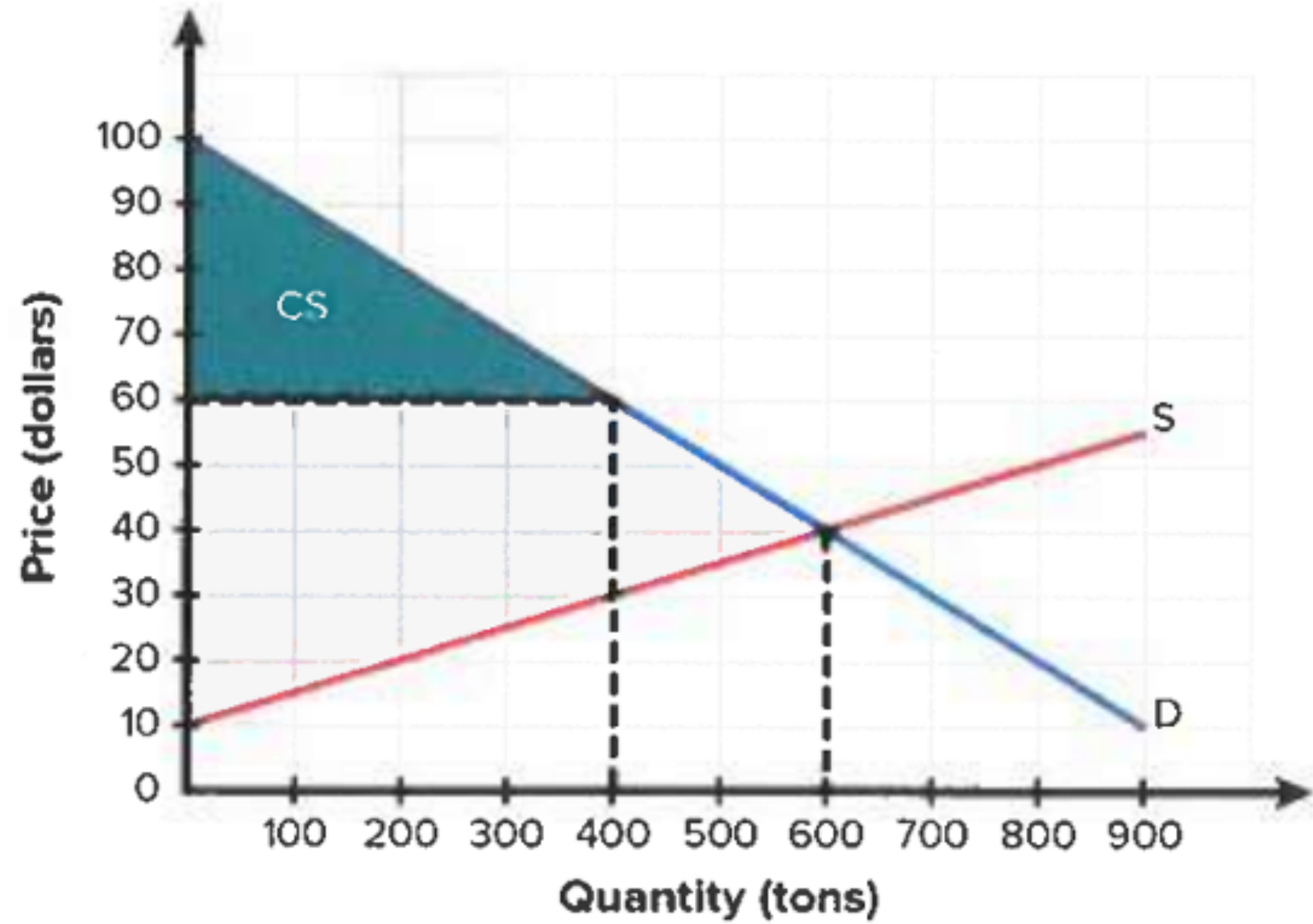


CS is above the price & below demand.

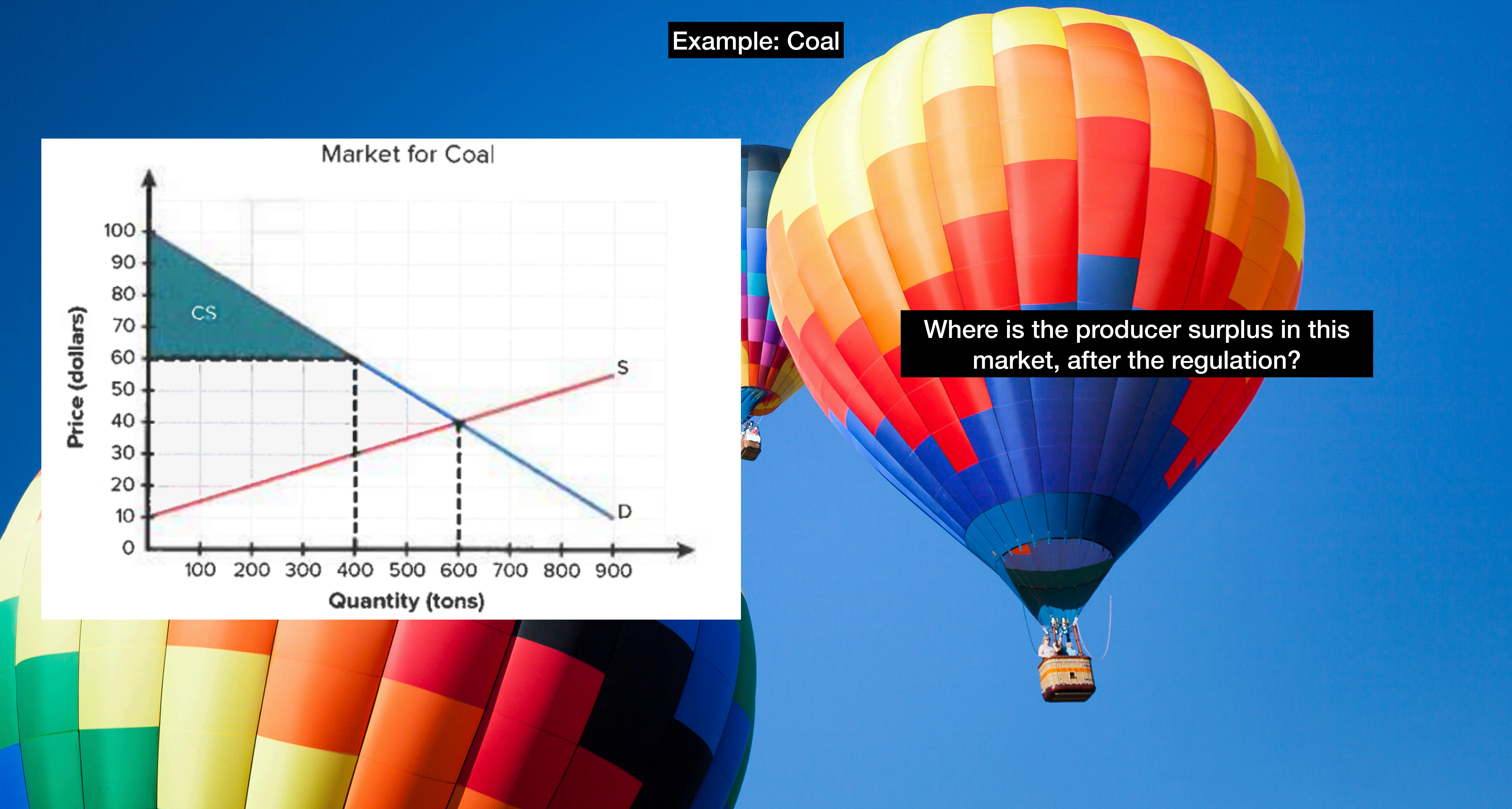


## Example: Coal

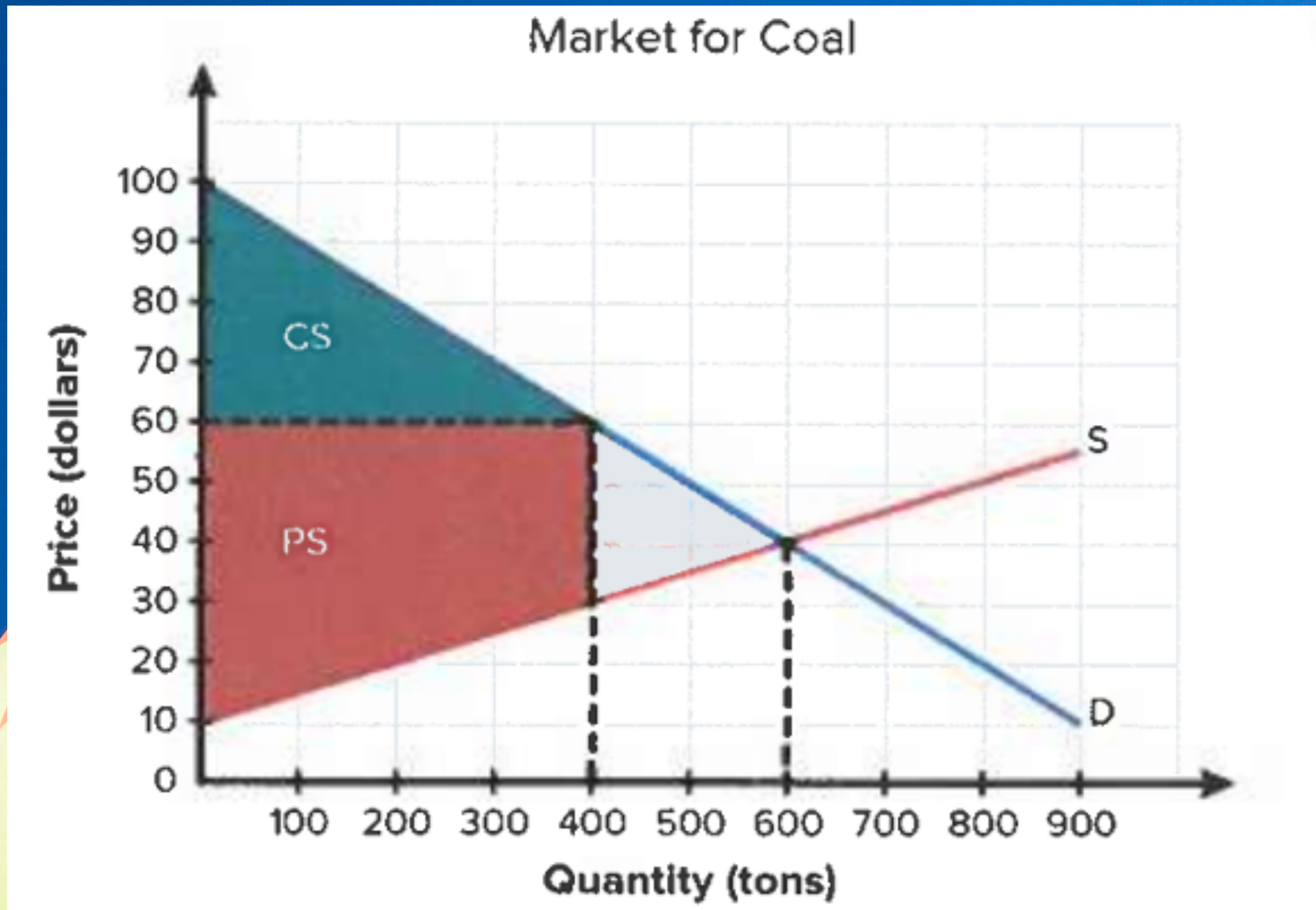
Market for Coal



Where is the producer surplus in this market, after the regulation?



## Example: Coal

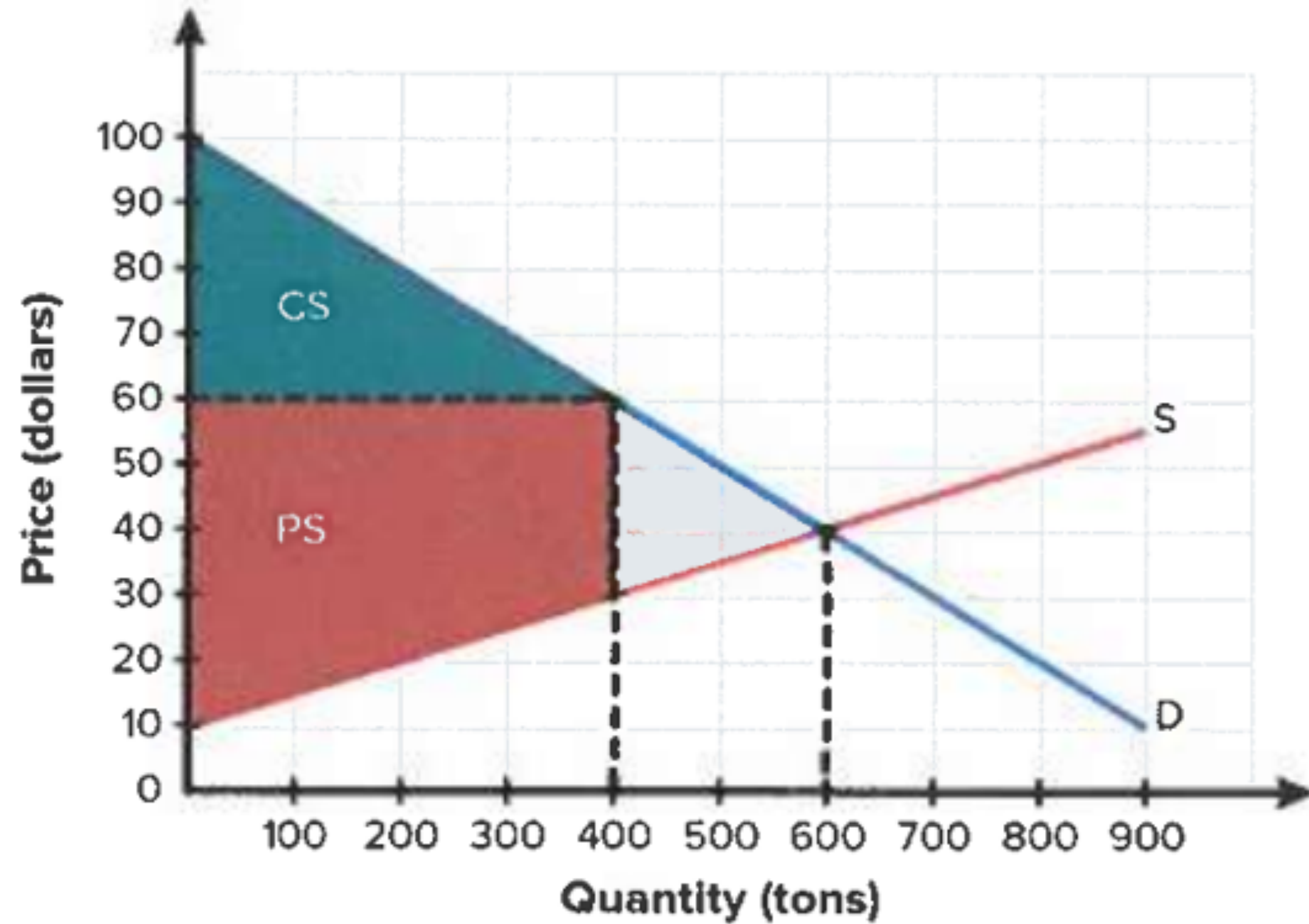


What do you notice about this market?



## Example: Coal

Market for Coal



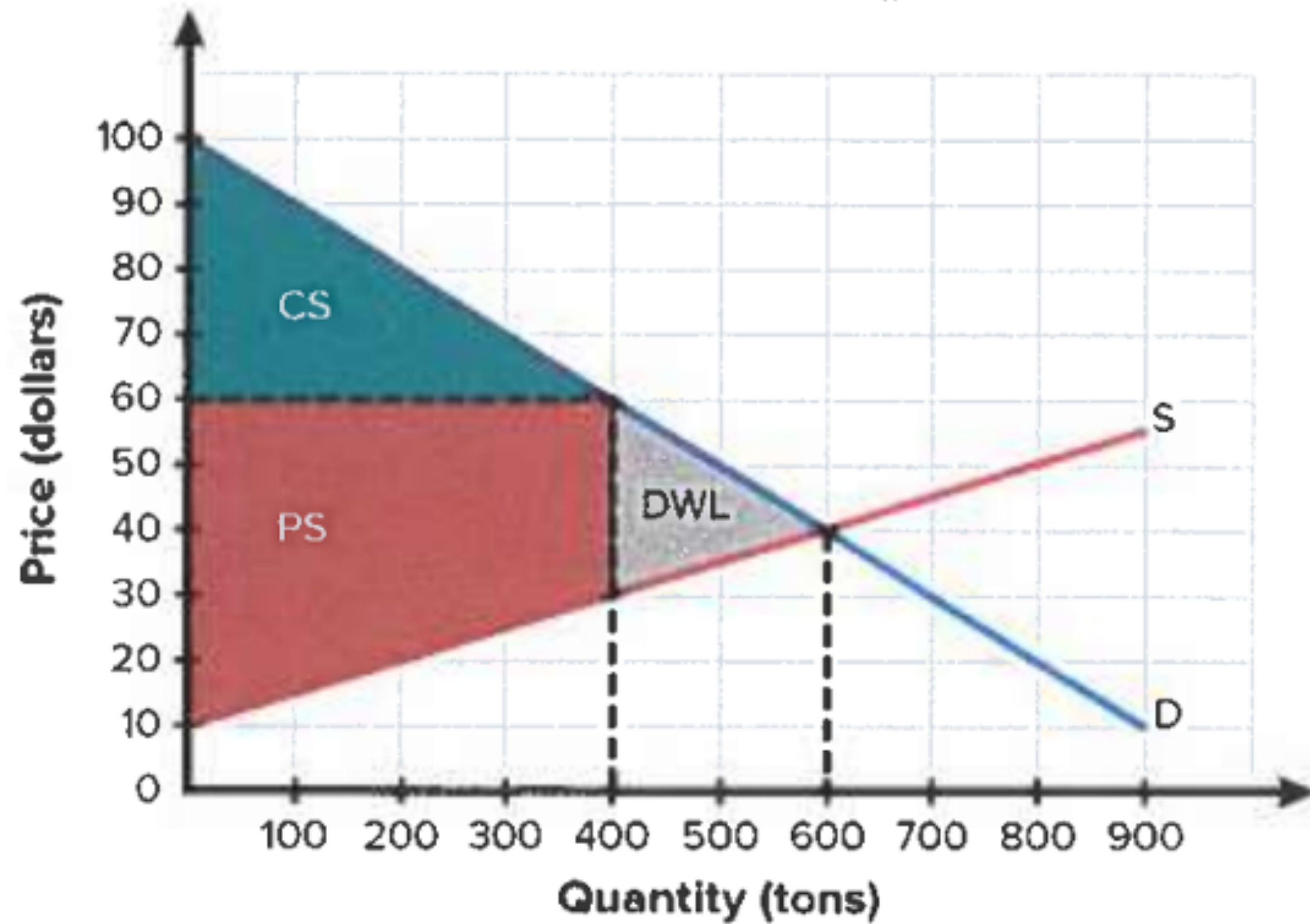
**NOTICE:** There is uncaptured surplus in the market!

However, the market, in this case, is not allowed to adjust.

This surplus is forgone.

## Example: Coal

Market for Coal

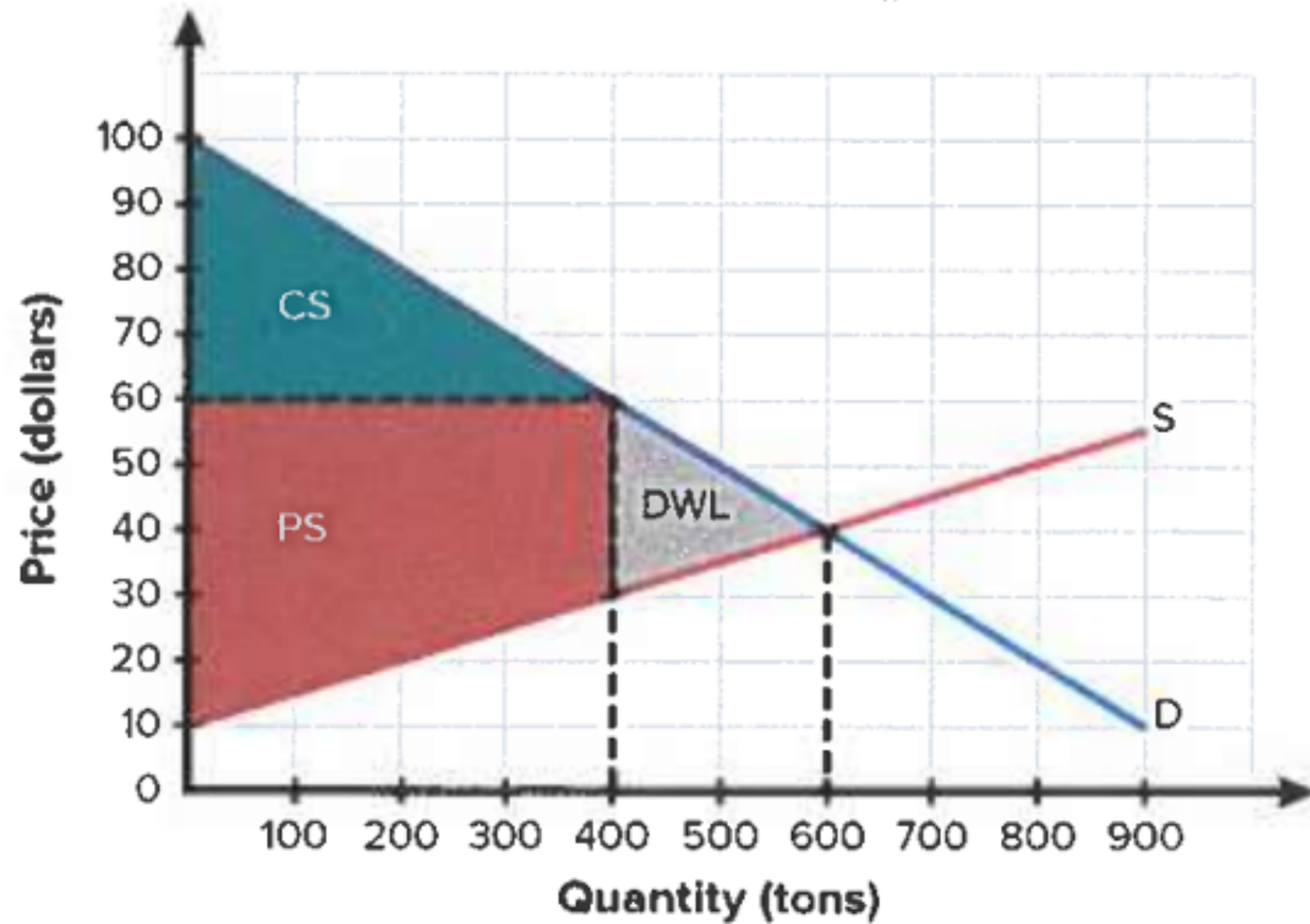


That forgone surplus is deadweight loss.

It is calculated just like CS & PS, computing the area of a triangle:

## Example: Coal

Market for Coal



That forgone surplus is deadweight loss.

It is calculated just like CS & PS, computing the area of a triangle:

$$\frac{1}{2}(600-400) * (60-30)$$

$$\frac{1}{2}(200) * (30)$$

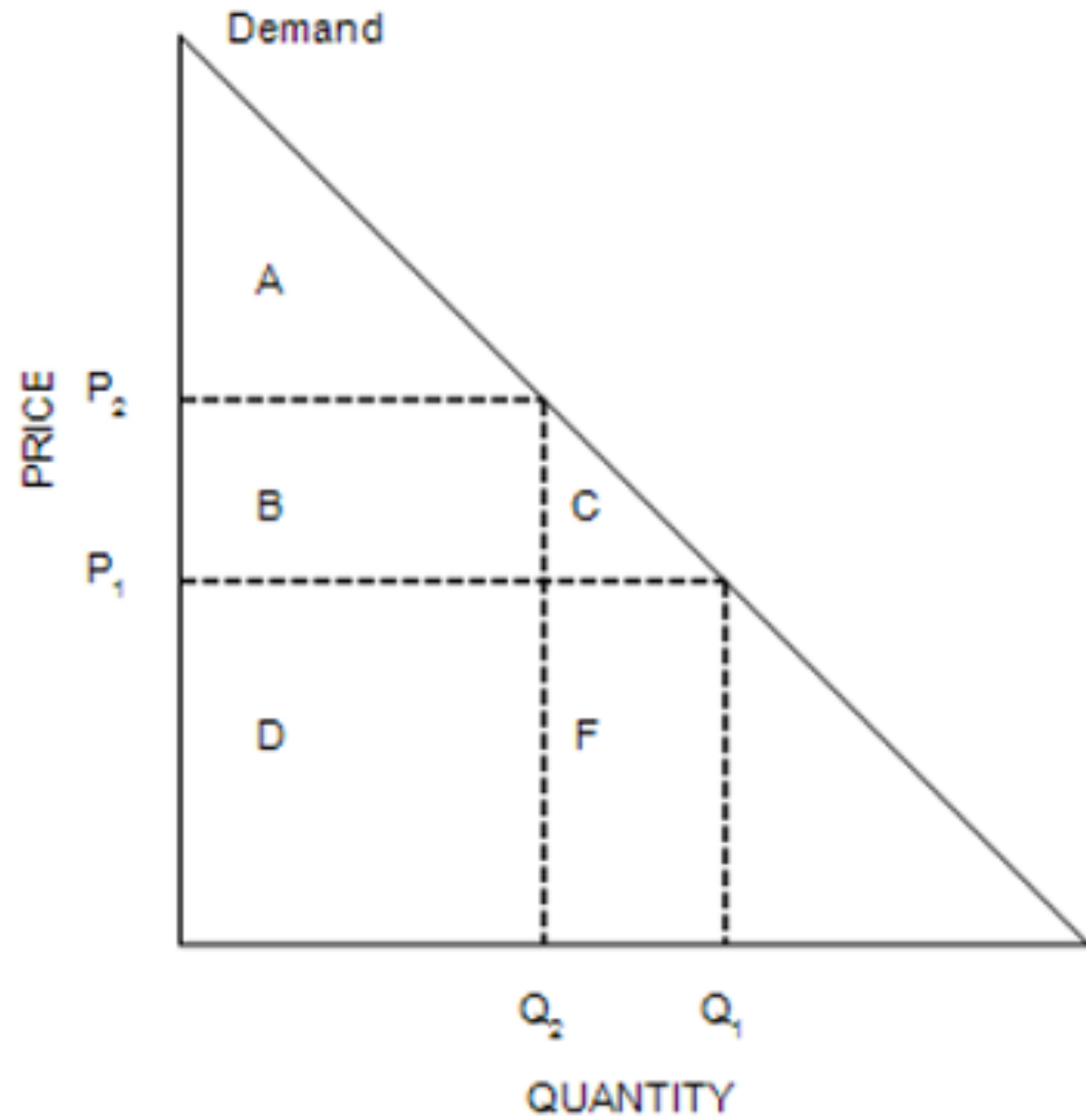
$$\text{DWL} = \$130$$

# Deadweight Loss

- Economists use deadweight loss as a measure for the potential benefits a market economy could've achieved if market conditions were allowed to freely adjust.
- Also used to measure the costs of policies that prevent the market (price system) from freely adjusting.

Practice

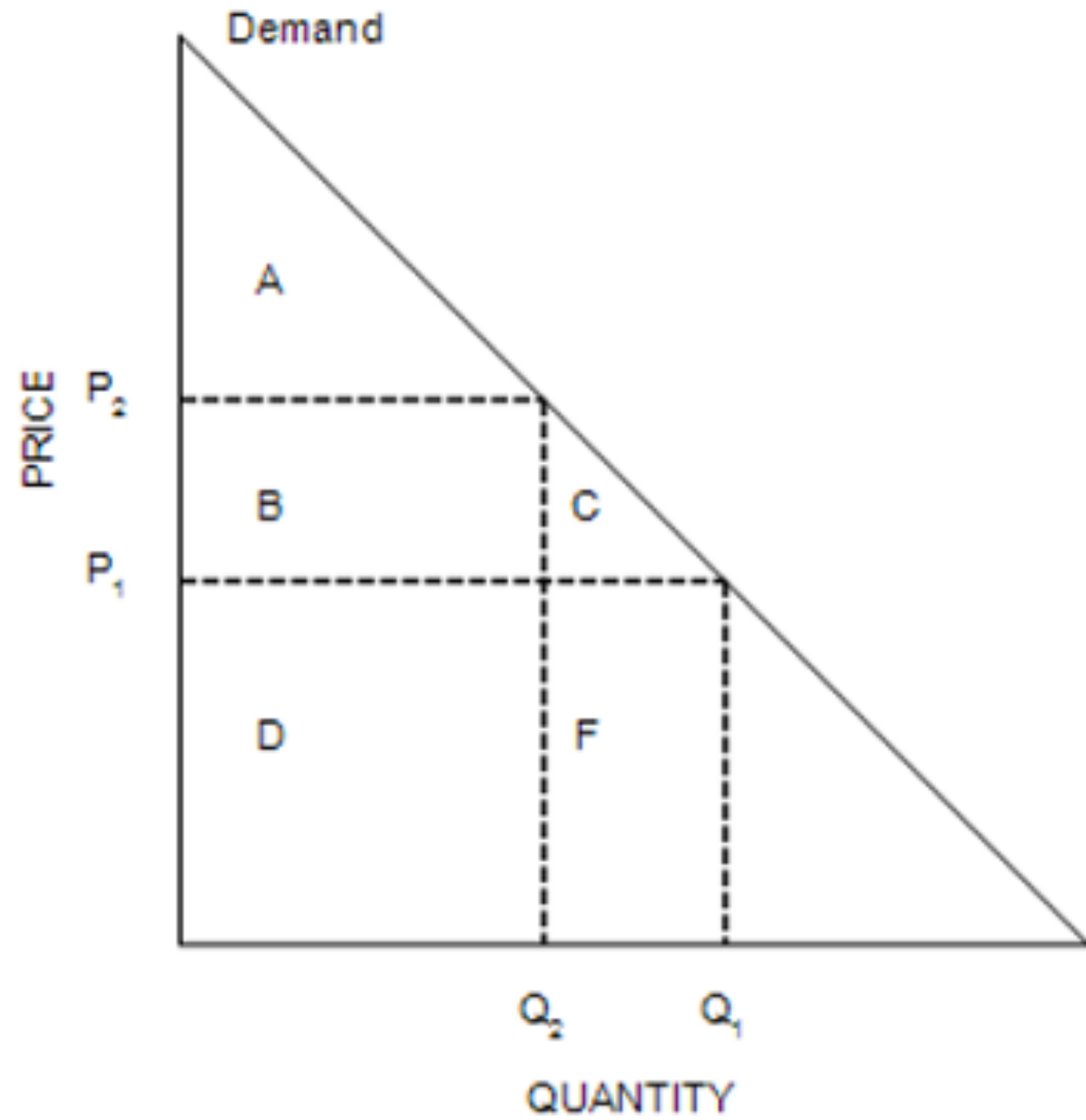
Figure 7-1



15. Refer to Figure 7-1. When the price is  $P_2$ , consumer surplus is

- a.  $A+B+C$ .
- b.  $A+B+D$ .
- c. A.
- d.  $A+B$ .

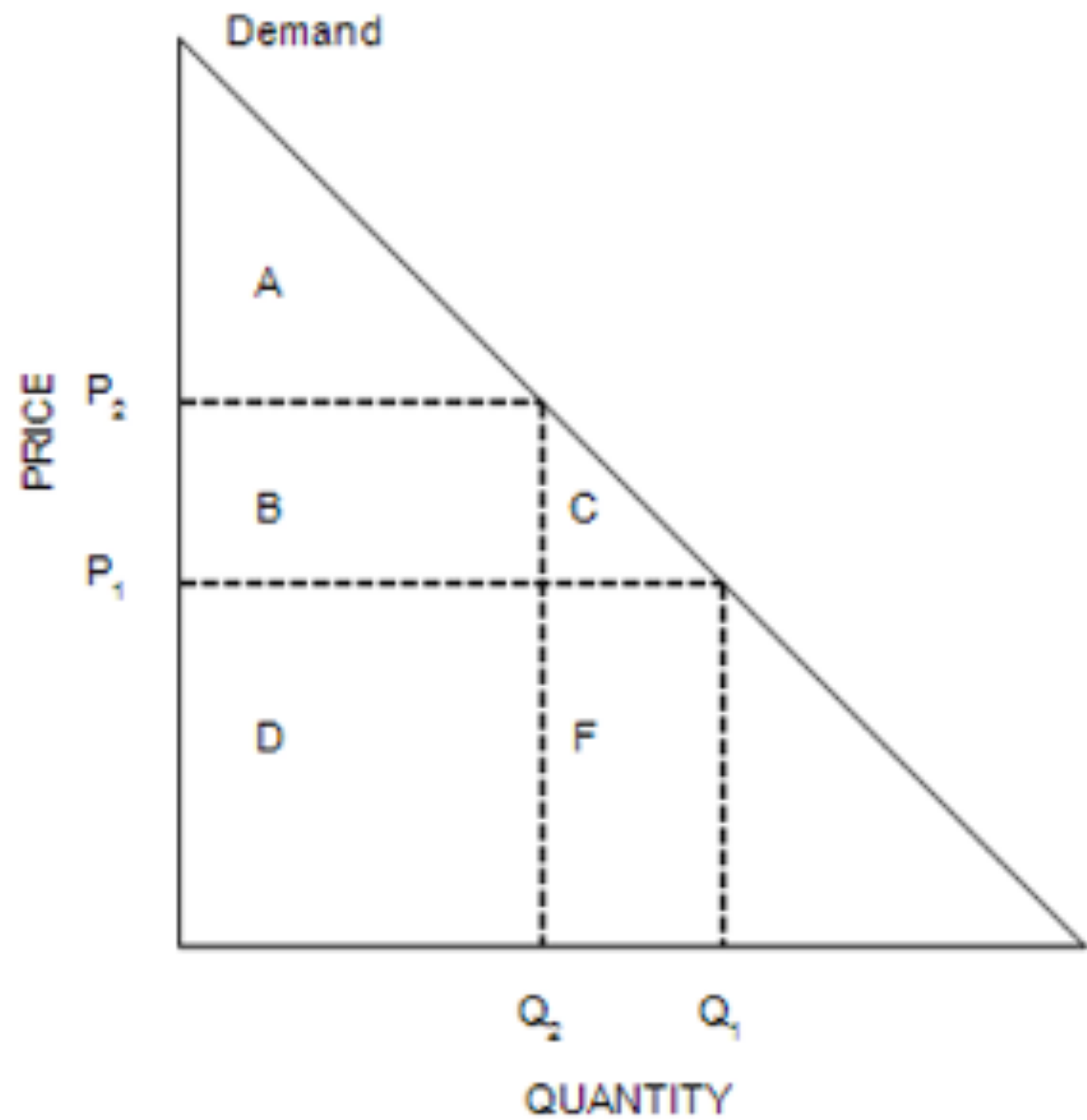
Figure 7-1



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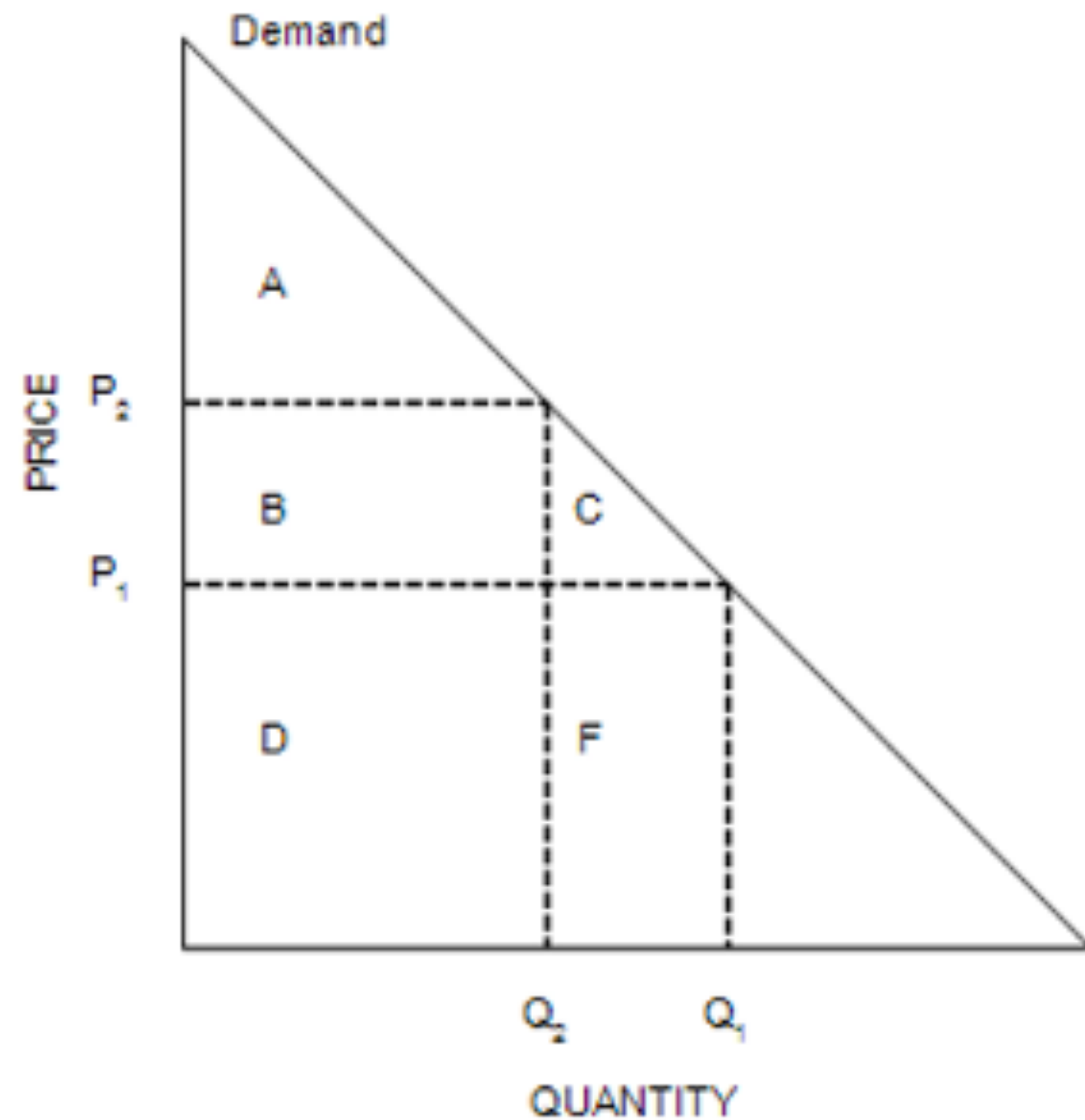
- a.  $A+B+C$ .
- b.  $A+B+D$ .
- c. A.
- d.  $A+B$ .

Figure 7-1

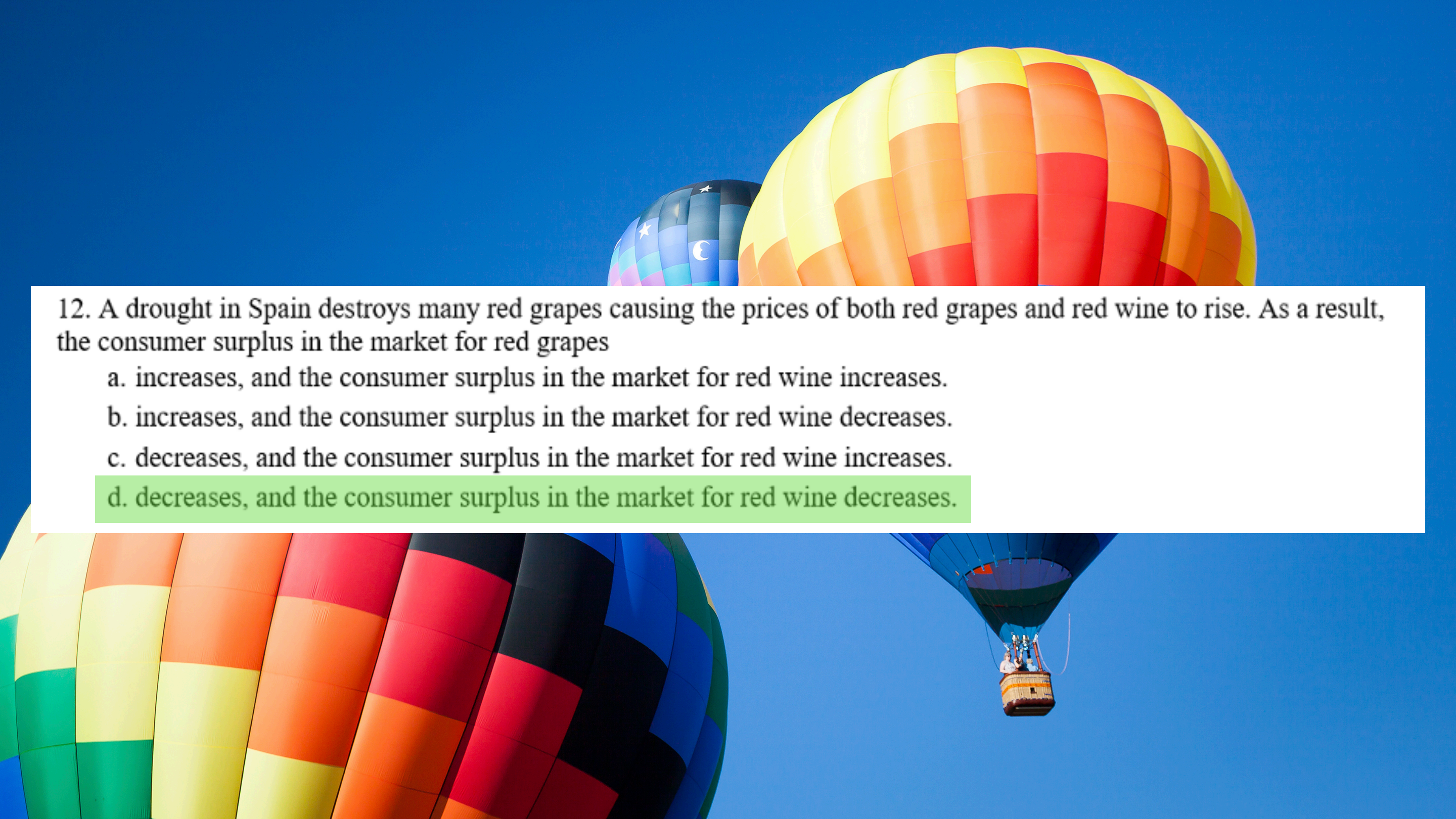


16. Refer to Figure 7-1. Suppose that the price falls from  $P_2$  to  $P_1$ . Area B represents the
- decrease in producer surplus that results from a downward-sloping demand curve.
  - additional consumer surplus to initial consumers when the price falls.
  - consumer surplus to new consumers who enter the market.
  - decrease in producer surplus in the market when the price increases from  $P_1$  to  $P_2$ .

Figure 7-1



16. Refer to Figure 7-1. Suppose that the price falls from  $P_2$  to  $P_1$ . Area B represents the
- a. decrease in producer surplus that results from a downward-sloping demand curve.
  - b. additional consumer surplus to initial consumers when the price falls.
  - c. consumer surplus to new consumers who enter the market.
  - d. decrease in producer surplus in the market when the price increases from  $P_1$  to  $P_2$ .



12. A drought in Spain destroys many red grapes causing the prices of both red grapes and red wine to rise. As a result, the consumer surplus in the market for red grapes

- a. increases, and the consumer surplus in the market for red wine increases.
- b. increases, and the consumer surplus in the market for red wine decreases.
- c. decreases, and the consumer surplus in the market for red wine increases.
- d. decreases, and the consumer surplus in the market for red wine decreases.

**Table 7-4**

For each of the three potential buyers of apples, the table displays the willingness to pay for Bob, Sasha, and Ava, who are the only three buyers of apples. Assume that only three apples can be supplied per day.

|       | Willingness to Pay<br>(Dollars) |              |             |
|-------|---------------------------------|--------------|-------------|
|       | First Apple                     | Second Apple | Third Apple |
| Bob   | 2.00                            | 1.50         | 0.75        |
| Sasha | 1.50                            | 1.00         | 0.60        |
| Ava   | 0.75                            | 0.25         | 0.00        |

7. Refer to Table 7-4. The market quantity of apples demanded per day is exactly seven if the price of an apple,  $P$ , satisfies

- a.  $\$0.60 < P < \$0.75$ .
- b.  $\$0.60 < P < \$2.00$ .
- c.  $\$0.25 < P < \$0.75$ .
- d.  $\$0.25 < P < \$0.60$ .

**Table 7-4**

For each of the three potential buyers of apples, the table displays the willingness to pay for Bob, Sasha, and Ava, who are the only three buyers of apples. Assume that only three apples can be supplied per day.

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| Sasha | 1.50                            | 1.00         | 0.60        |
| Ava   | 0.75                            | 0.25         | 0.00        |

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- d.  $\$0.25 < P < \$0.60$ .

**Table 7-7**

| <b>Seller</b> | <b>Cost<br/>(Dollars)</b> |
|---------------|---------------------------|
| Mike          | 1,600                     |
| Laura         | 1,400                     |
| Sasha         | 1,100                     |
| David         | 900                       |
| Codi          | 700                       |

23. **Refer to Table 7-7.** If the market price is \$1,000, the producer surplus in the market is
- a. \$100.
  - b. \$400.
  - c. \$300.
  - d. \$700.

**Table 7-7**

| <b>Seller</b> | <b>Cost<br/>(Dollars)</b> |
|---------------|---------------------------|
| Mike          | 1,600                     |
| Laura         | 1,400                     |
| Sasha         | 1,100                     |
| David         | 900                       |
| Codi          | 700                       |

23. **Refer to Table 7-7.** If the market price is \$1,000, the producer surplus in the market is
- a. \$100.
  - b. \$400.**
  - c. \$300.
  - d. \$700.

So what?

# Efficiency vs. Equality

- Efficiency
  - A property of resource allocation.
  - Maximizing the total surplus received by all members of society.
- Equality
  - Property of distributing economic prosperity uniformly (or equally) among the members of society.

# Markets, Efficiency, & Equality

- The gains from trade in the market are like a pie to be shared among the market participants.
- Efficiency is all about making the pie as big as possible.
- Equality is all about how the pie should be sliced. It's about how the pie is distributed among the members of society.

# Markets, Efficiency, & Equality

- When economists & other policymakers emphasize equality, it usually comes at the cost of efficiency.
- The tragic irony?
  - By trying to make market outcomes equal, you treat economic actors **unequally**.
  - Further, you disincentivize the behavior that grows to the pie for all!

# Markets, Efficiency, & Equality

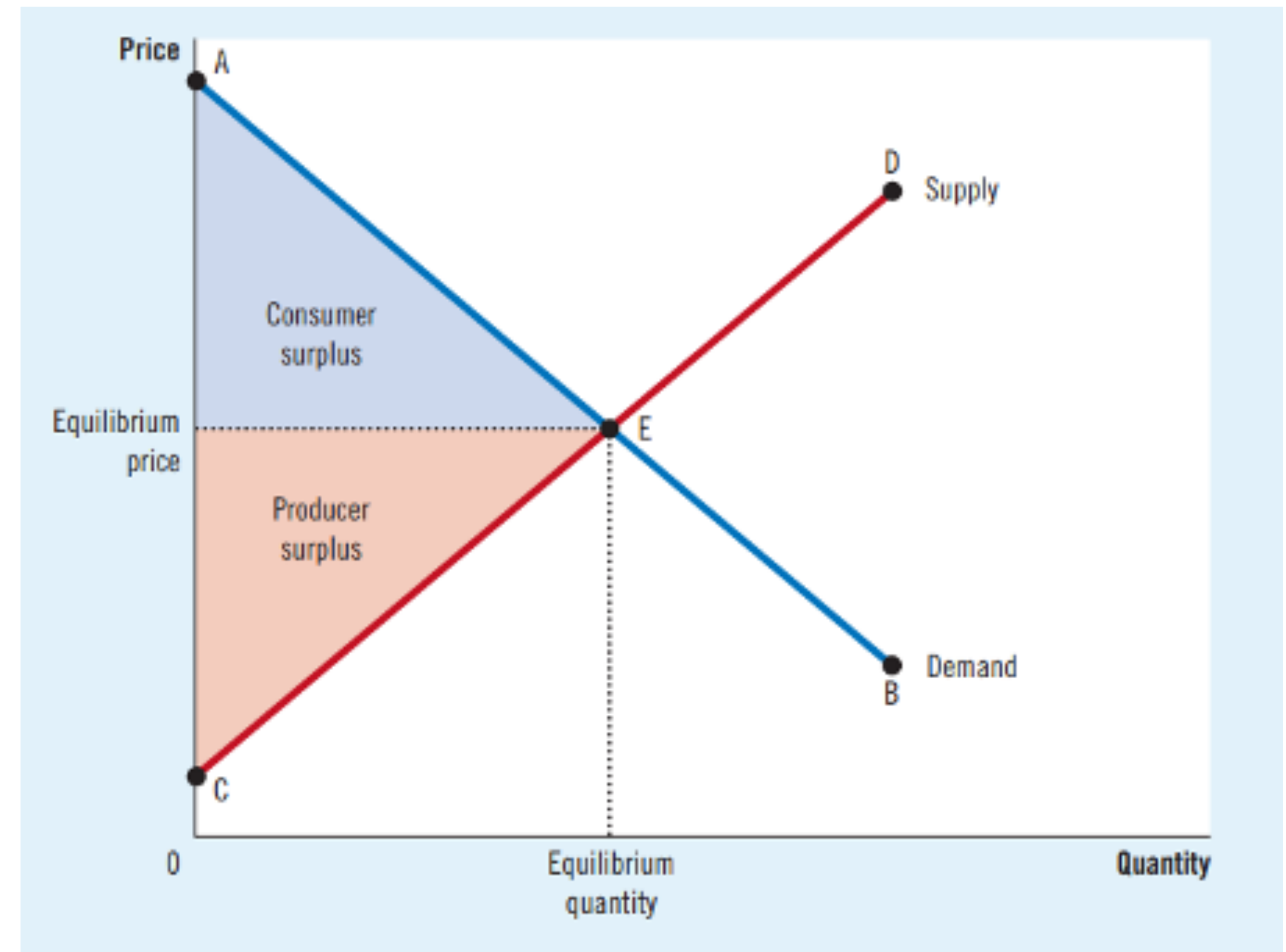
- The tools of economics help us analyze the potential costs, benefits, & unintended consequences of certain policy actions.
- What we often find is that free markets are the best way to distribute the pie (big pieces too) to all!

# Markets, Efficiency, & Equality

- Free markets allocate the supply of goods to the buyers who value them most highly.
- Free markets allocate the demand for goods to the sellers who produce them at the lowest cost.
- How? **The price system!**

# Markets, Efficiency, & Equality

- Marvelously, free markets produce the quantity of goods that maximize the sum of consumer and producer surplus!



**Thanks for your attention.  
End of class.**

**If you're reading this it means you're going through the slides to study.**

**The first three people that send me an email saying they've noticed this slide will get +2 points in the first midterm.**