Econ 200
Module 2
Lecture 5

Outline

1. Elasticity Exercises
2. Consumer Surplus
3. Producer Surplus
4. Economic Efficiency
5. CS/PS Exercises

Readings: Chapter 5.1-5.4

Four Measures of Elasticity

Measure	Equation	Negative	Positive	More elastic	Less elastic
Price Elasticity of Demand	$\dfrac{\text{\% change in quantity demanded}}{\text{\% change in price}}$	Always	Never	Over time, for substitutable goods and luxury items	In the short run, for unique and necessary items
Price Elasticity of Supply	$\dfrac{\text{\% change in quantity supplied}}{\text{\% change in price}}$	Never	Always	Over time, with flexible production	In the short run, with production constraints
Cross-Price Elasticity	$\dfrac{\text{\% change in quantity demanded of A}}{\text{\% change in price of B}}$	For comple-ments	For substitutes	For near perfect substitutes and strong complements	For loosely related goods
Income Elasticity	$\dfrac{\text{\% change in quantity demanded}}{\text{\% change in income}}$	For inferior goods	For normal goods	For luxury items with close substitutes	For unique and necessary items

Find the price elasticity of demand using the midpoint formula for the points along a demand curve: ($10,350) and ($20,150).

Find the price elasticity of demand using the midpoint formula for the points along a demand curve: ($10,350) and ($20,150).

$$\varepsilon_d = \frac{\%\Delta Q}{\%\Delta P} = \frac{(150-350)/[(150+350)/2]}{(\$20-\$10)/[(\$20+\$10)/2]} = \frac{-200/250}{\$10/\$15} = -1.2$$

Interchanging points yields the same answer.

$$\varepsilon_d = \frac{\%\Delta Q}{\%\Delta P} = \frac{(350-150)/[(350+150)/2]}{(\$10-\$20)/[(\$10+\$20)/2]} = \frac{200/250}{-\$10/\$15} = -1.2$$

The elasticity is unitless.

Find the change in total revenue using the following two points along a demand curve: ($20,150) and ($10,350). (Price is falling.)

While you're at it, what are the price and quantity effects?

1. $600
2. $500
3. -$500
4. -$600

Find the change in total revenue using the following two points along a demand curve: ($20,150) and ($10,350). (Price is falling.)

P

Price effect

$20
$10

Qty effect

150   350

Q
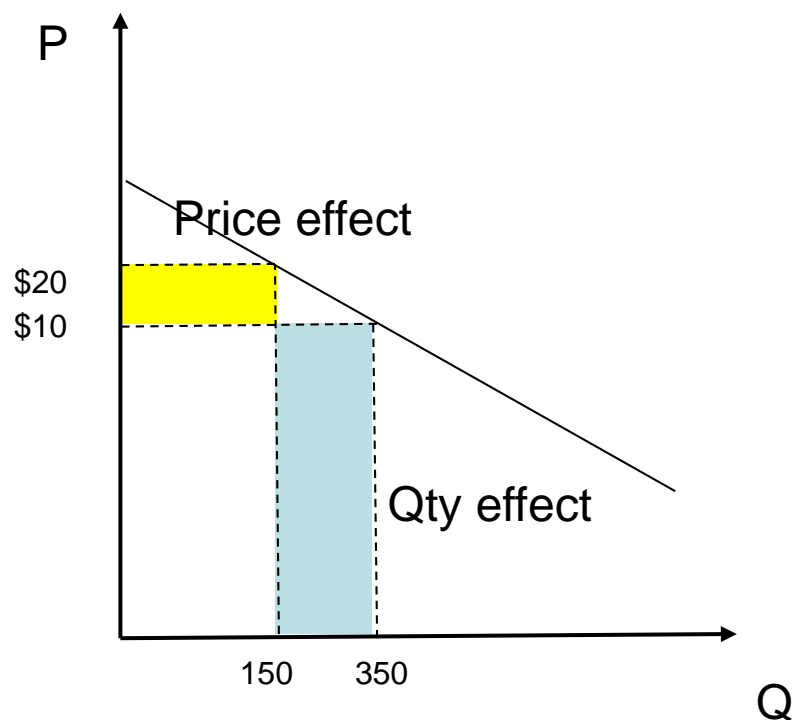
The total change in revenue is $P_2Q_2 - P_1Q_1 = \$10*350 - \$20*150 = \$3500 - \$3000 = \$500$

You can break this down into a quantity effect of +$2000
And a price effect of -$1500

So far we have learned that the market (a collection of many buyers and sellers) sets the price. Are we happy with that? Should we (as a society) ever intervene?

→Society may choose to intervene in markets when the market outcome is not equitable (must define this) or the market fails.

Should the Government Control Apartment Rents?

Rent control puts a legal limit on the rent that landlords can charge for an apartment.

Does it make tenants better off? What about landlords? How should we measure that?

We can start to understand the consequences of government intervention by returning to efficiency and a new concept – surplus!

Consumer and Producer Surplus

Surplus : Something that remains above what is used or needed

(Not the same as excess supply)

Consumer surplus is the difference between the highest price a consumer is willing to pay for a good or service and the actual price the consumer pays.

Producer surplus is the difference between the lowest price a firm would be willing to accept for a good or service and the price it actually receives.

Consumer Surplus

Consumer surplus is the difference between the highest price a consumer is willing to pay for a good or service and the actual price the consumer pays.

How much is a consumer willing to pay (WTP)?

Economists call the maximum price that consumers are willing to pay for the marginal good the **marginal benefit** of that good, and the demand curve can be called the **marginal benefit curve**.
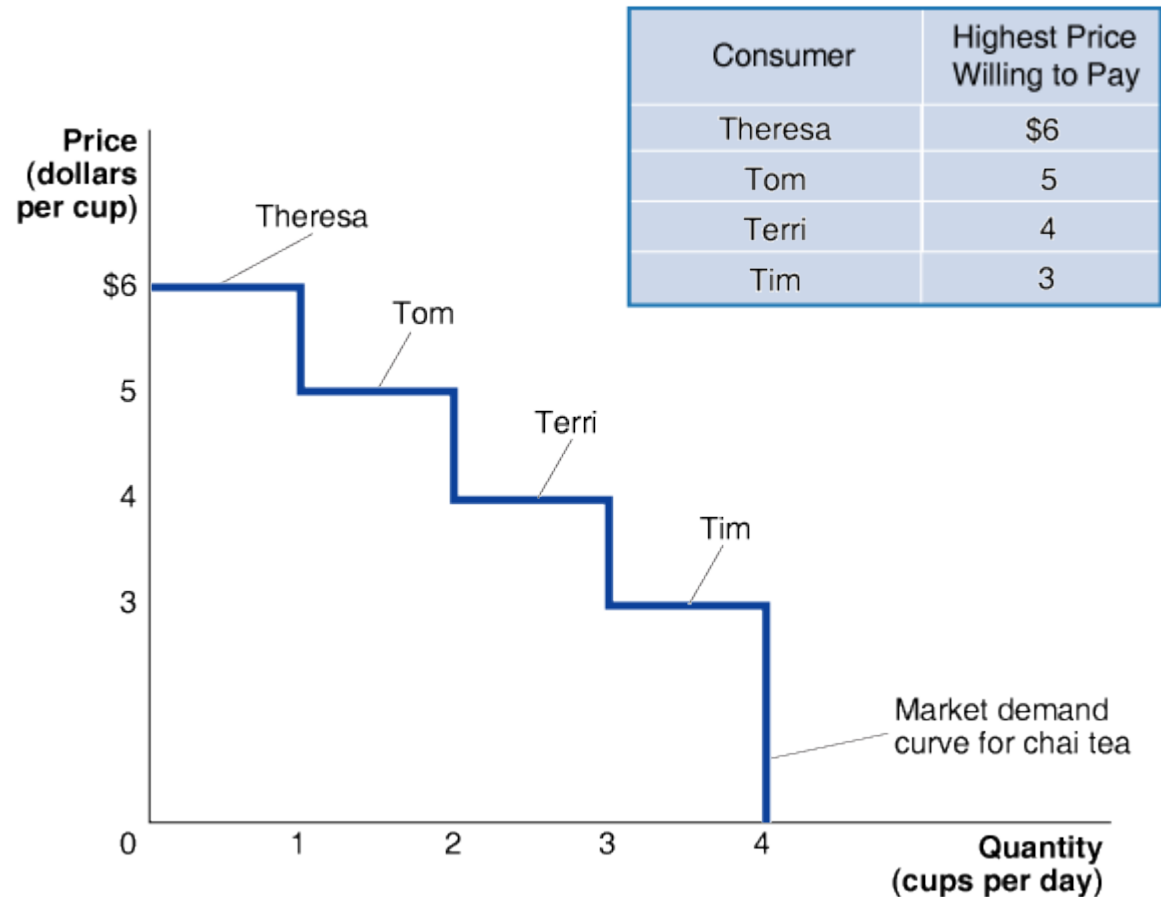
Deriving the Demand Curve for Chai Tea

Suppose four people are each interested in buying a cup of chai tea.

We can characterize them by the highest price they are willing to pay.

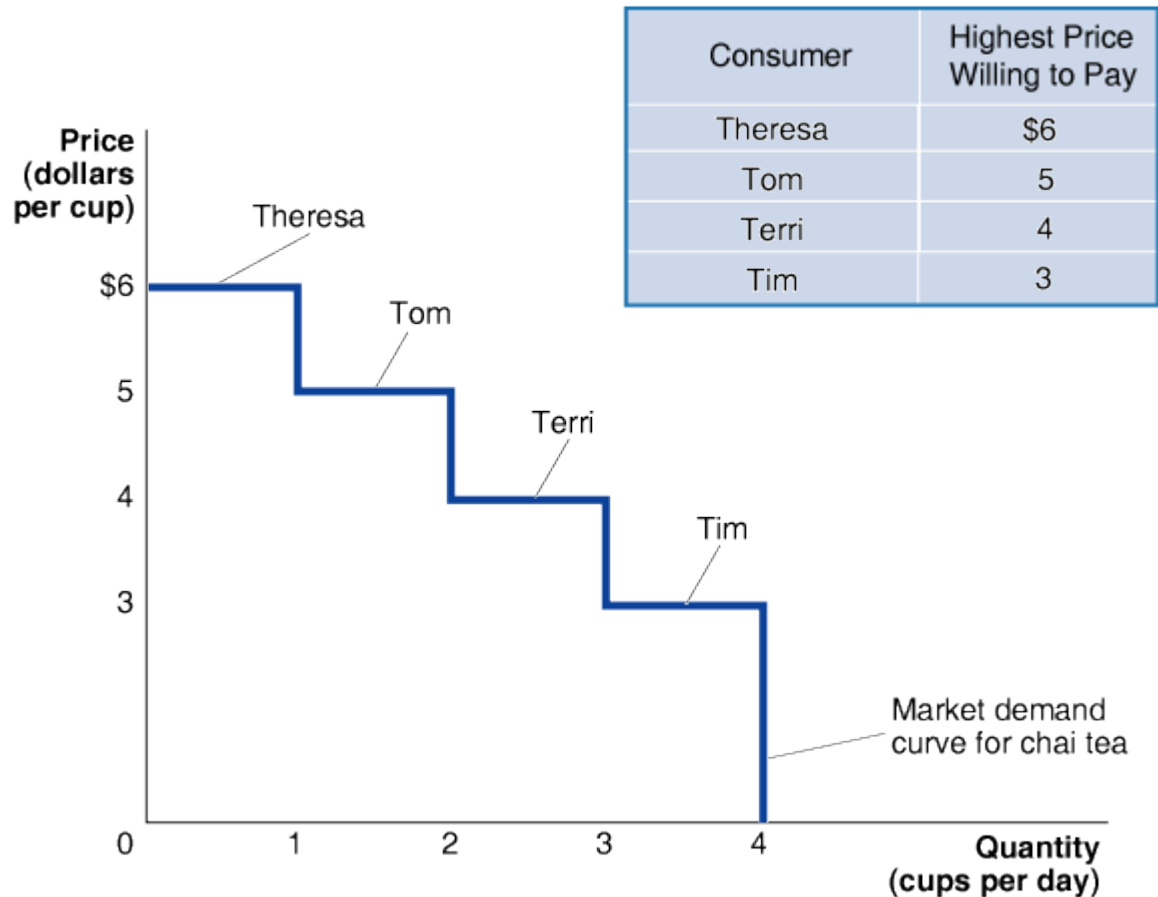At prices above $6, no chai tea will be sold.

At $6, one cup will be sold, etc.

Consumer	Highest Price Willing to Pay
Theresa	$6
Tom	5
Terri	4
Tim	3

Price (dollars per cup)

Theresa

Tom

Terri

Tim

Market demand curve for chai tea

$6

5

4

3

0   1   2   3   4

Quantity (cups per day)

How Much Benefit Will Chai Tea Drinkers Receive?

That depends on the price and their **marginal benefit**, the additional benefit to a consumer from consuming one more unit of a good or service.

If the price is low, many of the consumers benefit.

If the price is high, few (if any) of the consumers benefit.

Consumer	Highest Price Willing to Pay
Theresa	$6
Tom	5
Terri	4
Tim	3

Price (dollars per cup)

Theresa

Tom

Terri

Tim

Market demand curve for chai tea

Quantity (cups per day)

Consumer Surplus at a Price of $3.50

Theresa was willing to pay $6.00; a cup of chai tea is "worth" $6.00 to her.

She got it for $3.50, so she derives a net benefit of
$6.00 − $3.50 = $2.50.

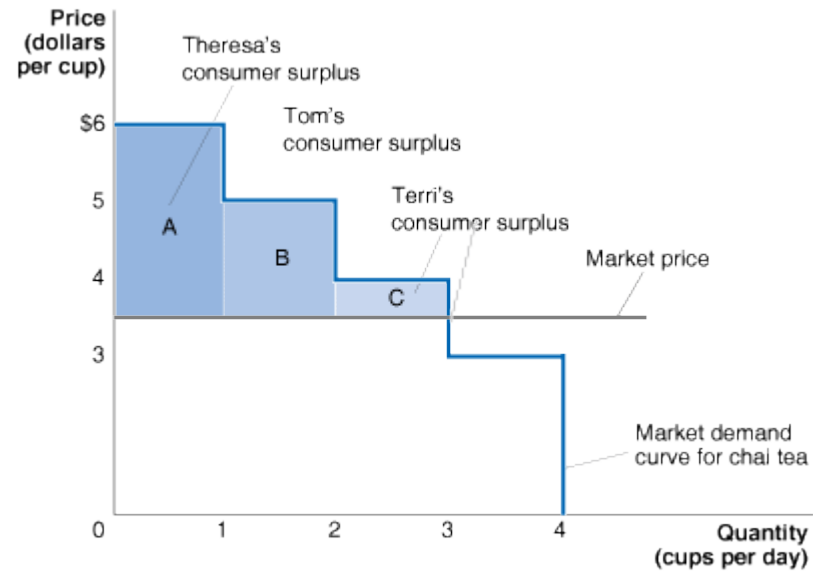Area *A* represents this net benefit, and is known as Theresa's consumer surplus in the chai tea market.
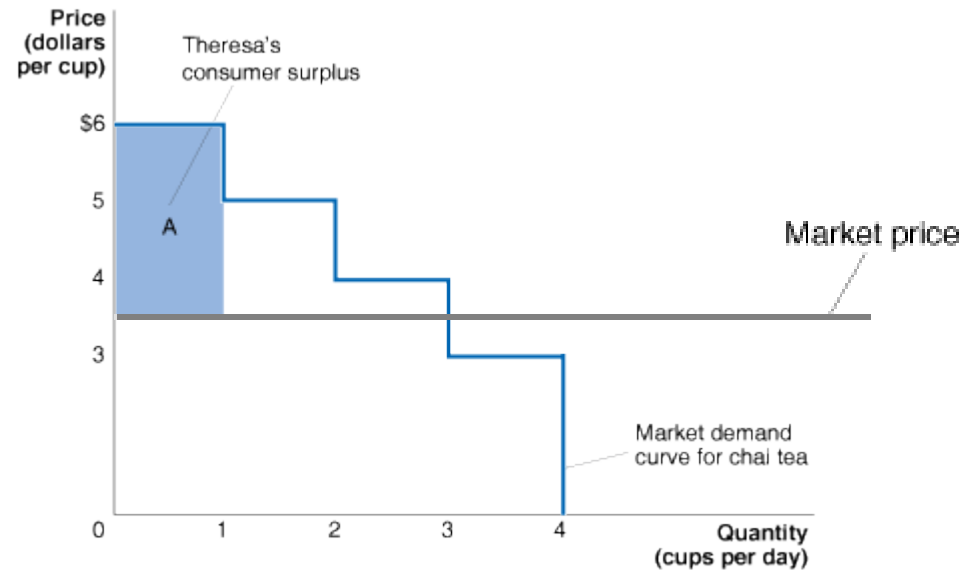
(a) Consumer surplus with a market price of $3.50

Consumer Surplus at a Price of $3.50—continued

Tom and Terri also obtain consumer surplus, equal to $1.50 (area *B*) and $0.50 (area *C*).

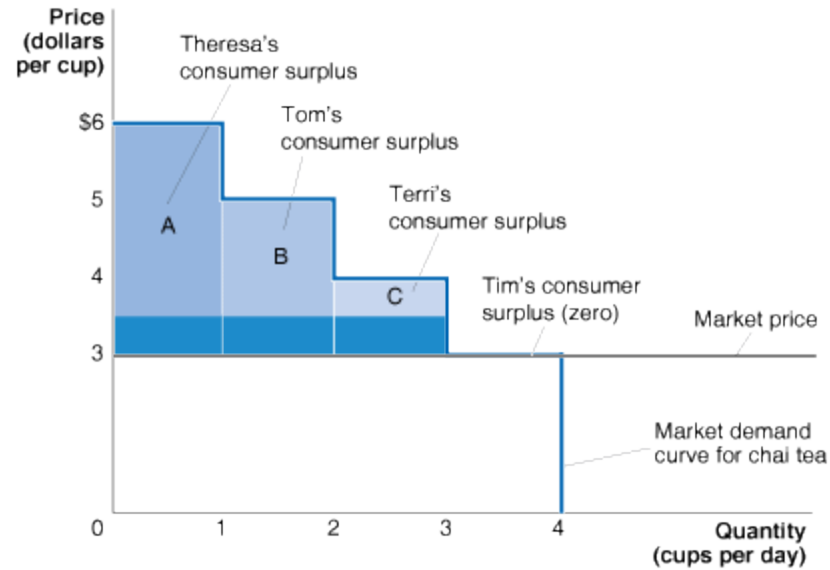The sum of the areas of rectangles *A*, *B*, and *C* is called the consumer surplus in the chai tea market.

(a) Consumer surplus with a market price of $3.50

Consumer Surplus If Price Falls to $3.00

If the price falls to $3.00, Theresa, Tom, and Terri each gain an additional $0.50 of consumer surplus.

The overall consumer surplus remains the area below the demand curve, above the (new) price.

(b) Consumer surplus with a market price of $3.00

Total Consumer Surplus in the Market for Chai Tea

The market for chai tea is larger than just our four consumers.

Consumer surplus in this market = the area below the demand curve, above price.

Price
(dollars
per cup)

Total consumer surplus in
the market for chai tea

$2.00

Demand

0

15,000   Quantity
(cups per
day)
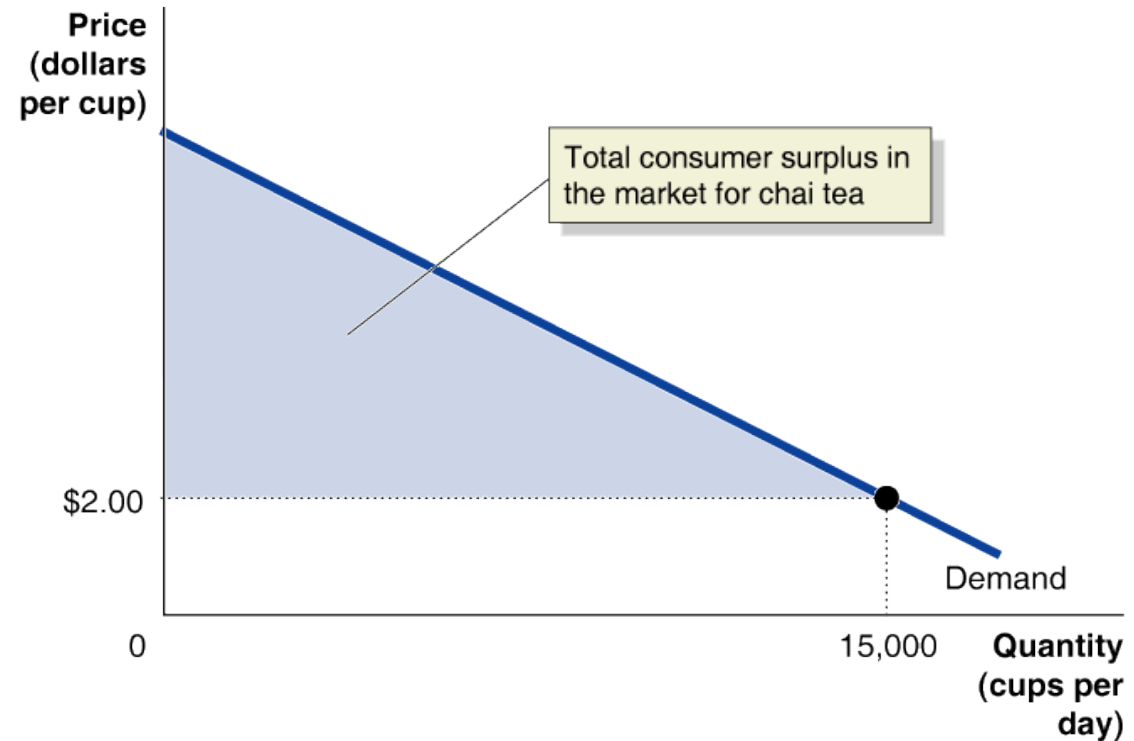
Producer Surplus

Producer surplus can be thought of in much the same way as consumer surplus.

Producer surplus: The difference between the lowest price a firm would accept for a good or service and the price it actually receives.

What is the lowest price a firm would accept for a good or service?

*The **marginal cost** of producing that good or service.*

Marginal cost: the additional cost to a firm of producing one more unit of a good or service.

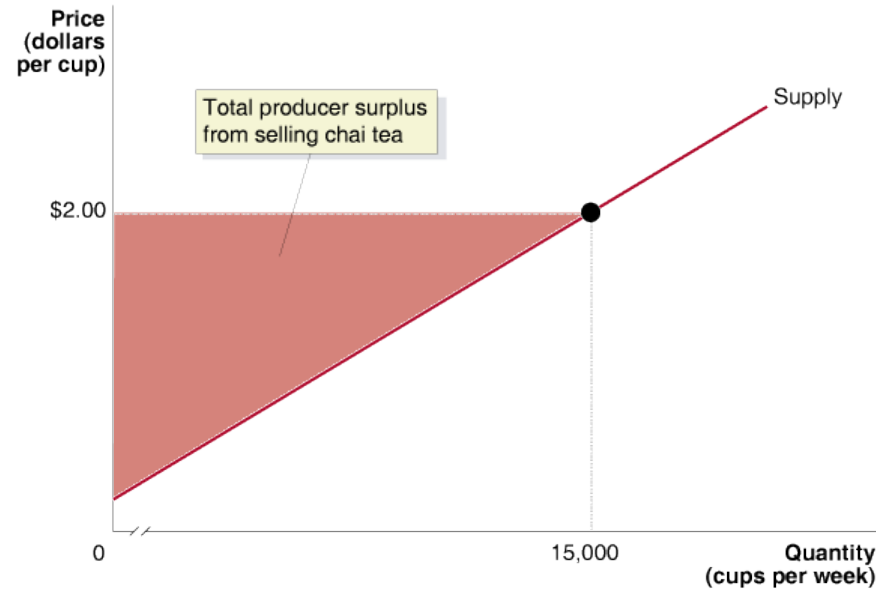# Measuring Producer Surplus (Single Firm)

When the market price of tea is $2.00, Heavenly Tea receives producer surplus of $0.75 on the first cup, $0.50 on the second cup, and $0.25 on the third cup.

(a) Producer surplus for Heavenly Tea
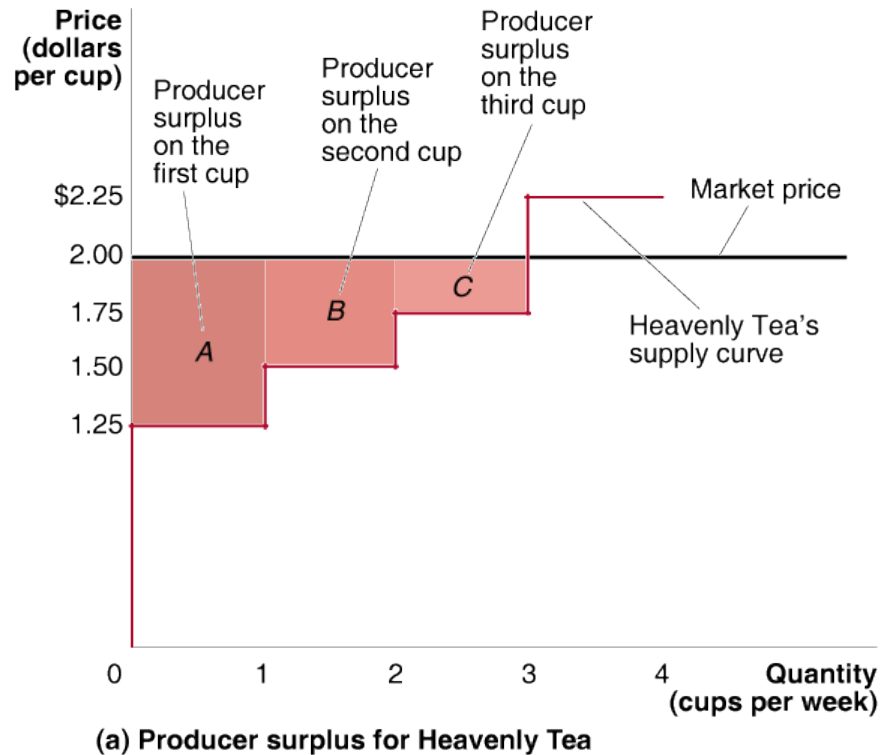
Measuring Producer Surplus (Entire Market)

Total producer surplus is equal to the area above the supply curve and below the market price of $2.00.

(b) Total producer surplus in the market for chai tea

What Consumer and Producer Surplus Measure

Consumer surplus measures the *net* benefit to consumers from participating in a market rather than the *total* benefit.

Consumer Surplus = Total Benefit – Total Price Paid

Similarly, producer surplus measures the *net* benefit received by producers from participating in a market.

Producer Surplus = Total Revenue – Total Cost

Use the following demand schedule to calculate consumer surplus if the market price is $5.

Price	Quantity	Consumer Surplus
1	160	
2	140	
3	120	
4	100	
5	80	
6	60	
7	40	
8	20	

Use the following demand schedule to calculate consumer surplus if the market price is $5.

Price	Quantity	Consumer Surplus
1	160	$0
2	140	$0
3	120	$0
4	100	$0
5	80	($5 - $5)*20 = $0
6	60	($6 - $5)*20 = $20
7	40	($7 - $5)*20 = $40
8	20	($8 - $5)*20 = $60

- Those with a maximum willingness to pay below market price do not buy the good.
- Those with a maximum willingness to pay equal to market price do not receive consumer surplus.
- Those with a maximum willingness to pay above the market price receive consumer surplus.
- Consumer surplus = $20 + $40 + $60 = $120

Use the following graph to calculate the consumer and producer surplus when the price is $200.
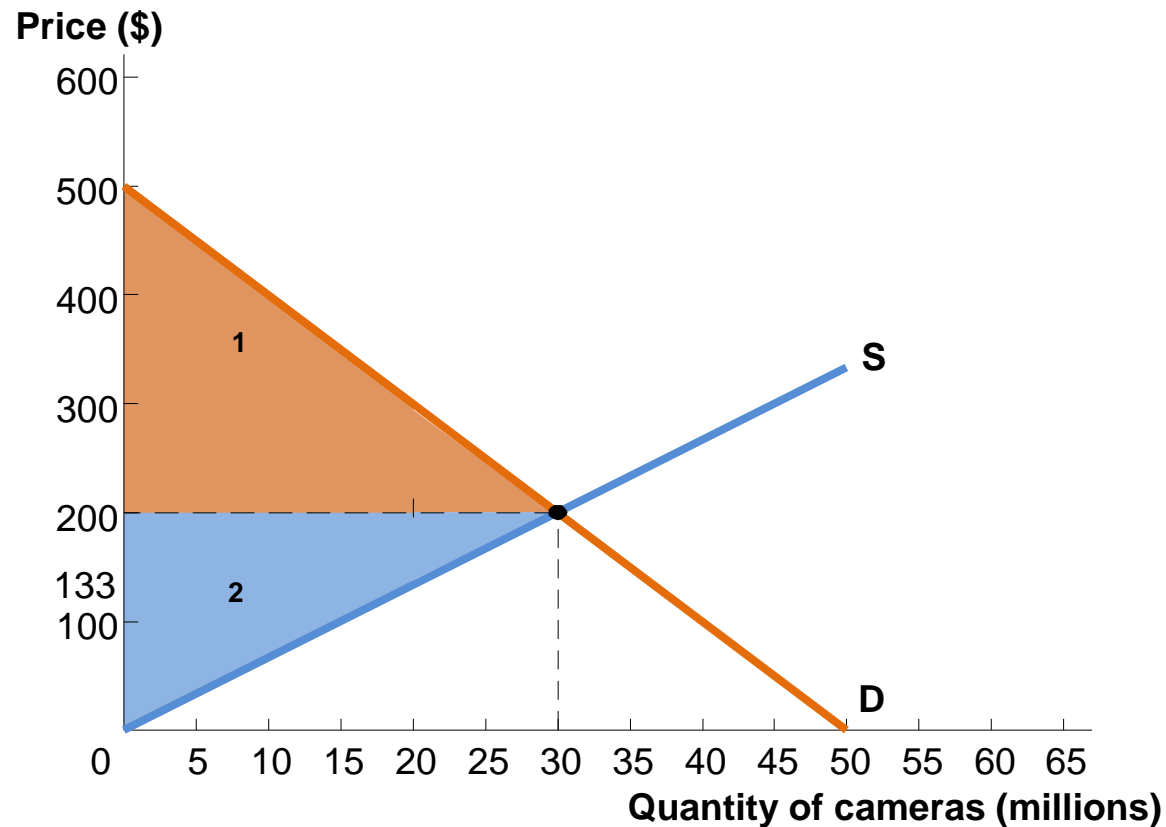
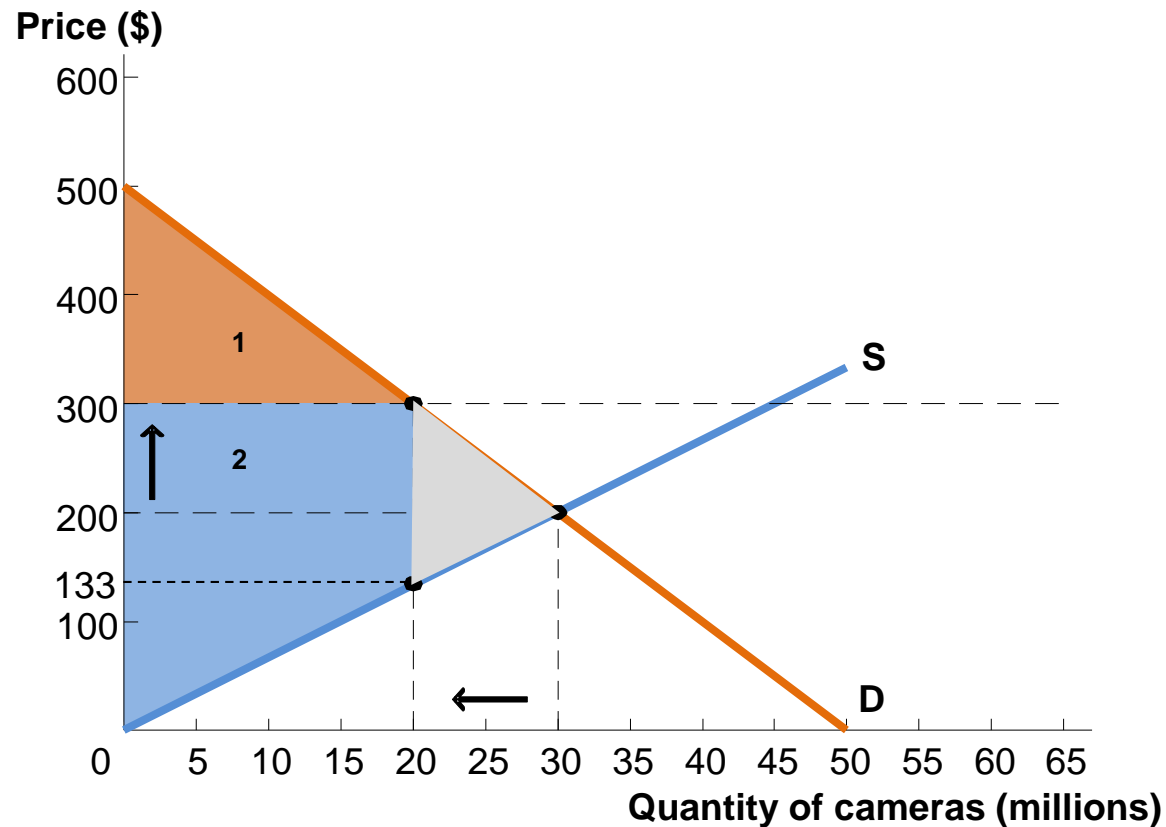Use the following graph to calculate the consumer and producer surplus when the price is $200.
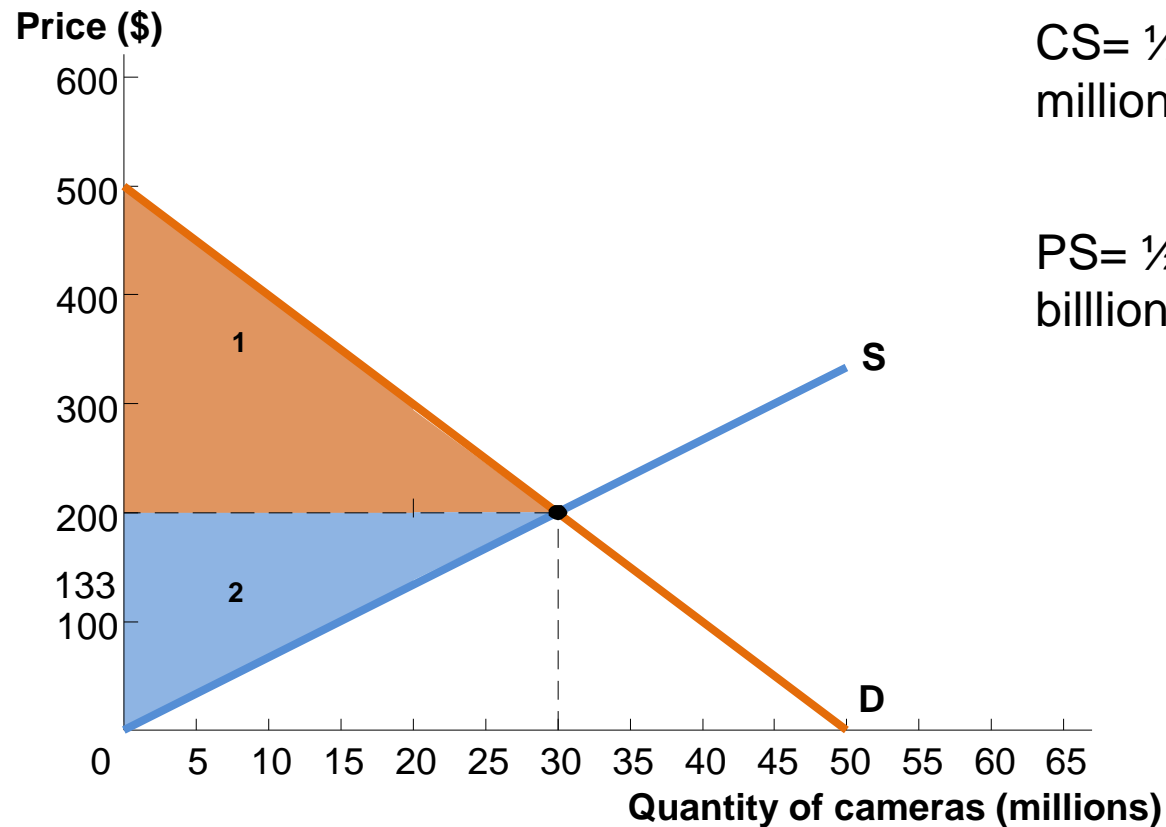
CS= ½ ($500-$200)*30 million = $4.5 billion

PS= ½ ($200-$0)*30 = $3 billlion
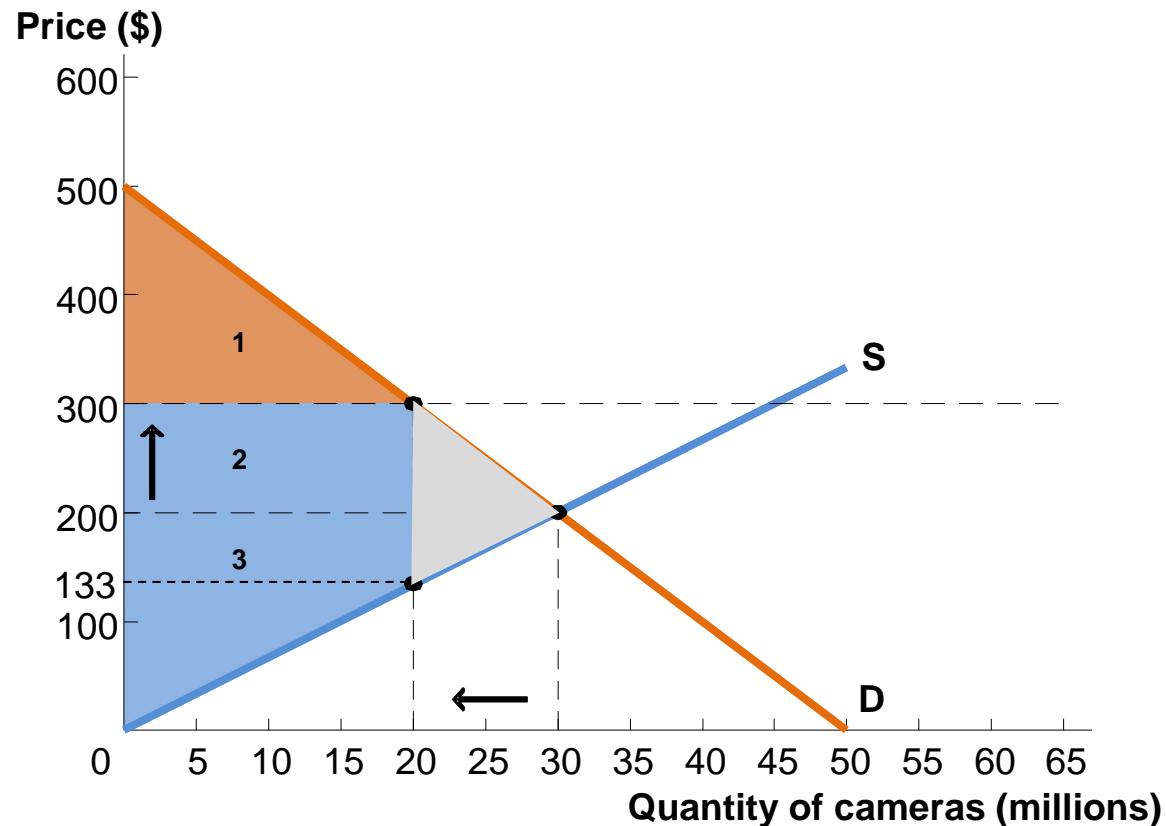
Use the following graph to calculate the total surplus if the price is $300.

Use the following graph to calculate the total surplus if the price is $300.

CS = ½ × 20M × ($500 - $300) = $2B

PS = $3B - ½ × 10M × ($200 - $133.33) + 20M × ($300 - $200) = $4.66B

Total surplus = $2B + $4.33B = $6.665B