Course: Economics of Industry

Lecture 13: Price Discrimination

Presented by Rustam Gulyamov

Price Discrimination

- In order for price discrimination to take place:

1) A firm must have market power
   -a PC firm that raises price will get zero sales
2) The firm must be able to distinguish between consumers
   -the firm must know consumer demand or elasticity of demand
3) The firm must be able to prevent resale

1st Degree Price Discrimination

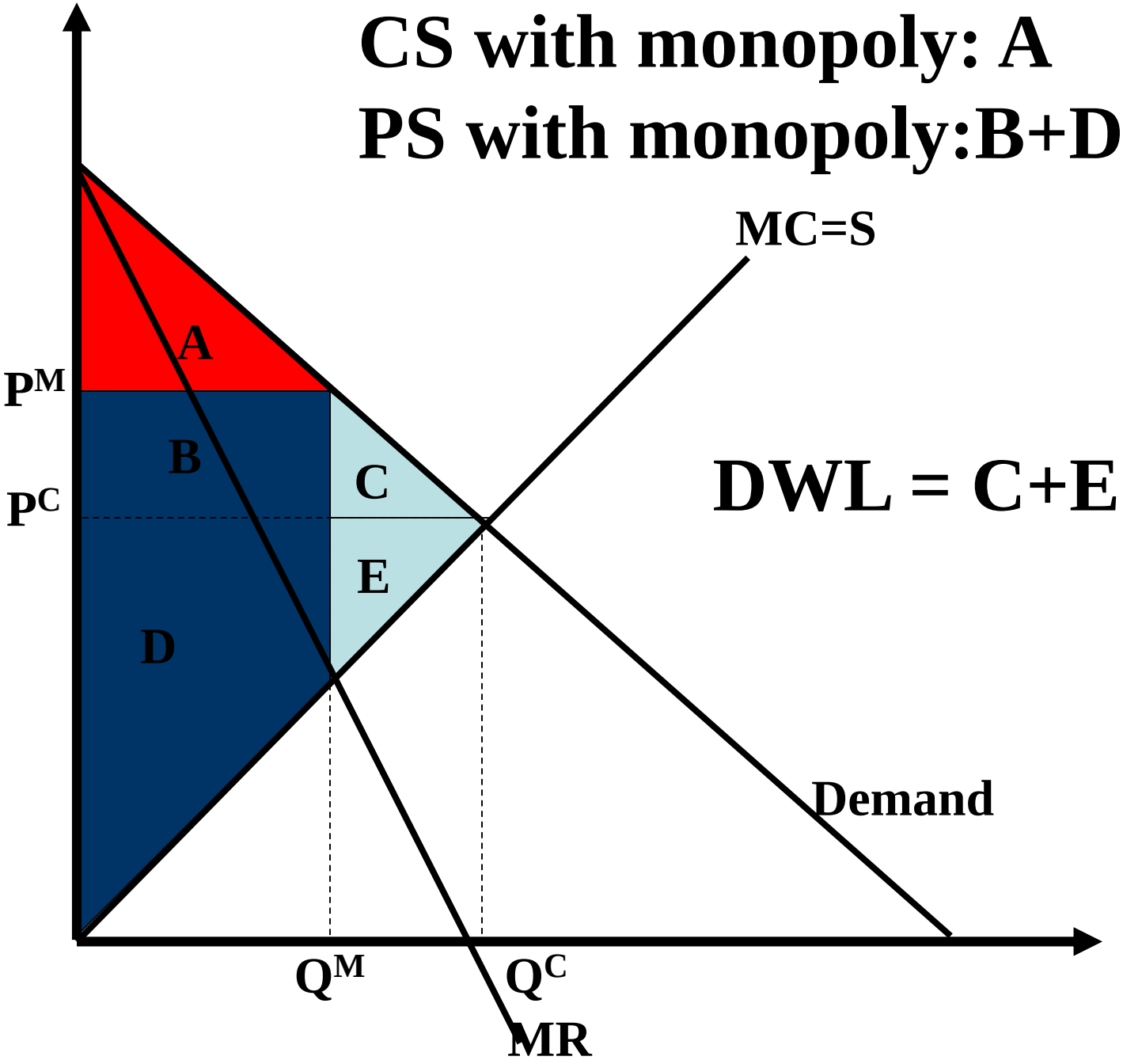
In first degree price discrimination, the monopolist charges each consumer their maximum willingness to pay (ie: each quantity is sold at its intersection on the demand curve)

Examples:

-Auctions (higher willingness to pays will push up price)

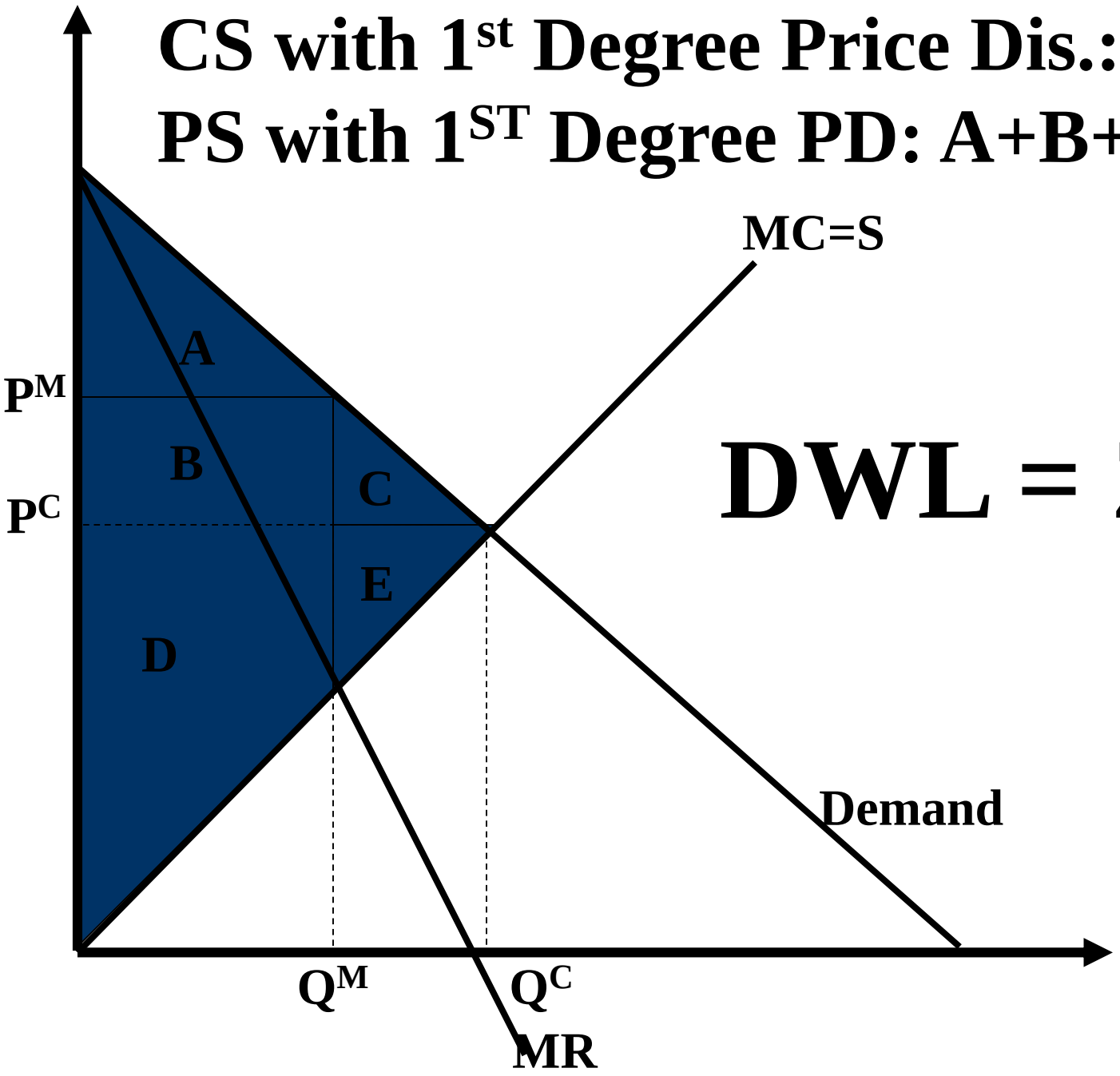
-Sizing up customers (asking questions relating to living arrangements and work, evaluating dress and speech patterns)

CS with monopoly: A
PS with monopoly:B+D



DWL = C+E

CS with 1st Degree Price Dis.: 0
PS with 1ST Degree PD: A+B+C+D+E



DWL = ZERO!

1st Degree Price Discrimination

- First Degree Price Discrimination ELIMINATES consumer surplus (each consumer pays their maximum amount)

- First Degree Price Discrimination ELIMINATES deadweight loss (monopolists are able to provide goods to more consumers)

- FDPD is hard to accomplish and VERY vulnerable to resale

Note: MR and 1st Degree Price Discrimination

- For the monopolist,

  $MR=P+(\Delta P/\Delta Q)Q$

- But since increased sales do not affect the price of any other goods sold,

  $(\Delta P/\Delta Q)Q=0$

- Therefore, MR=P=D (The MR curve is the demand curve)

1st Degree Price Discrimination Example

Calculate CS,PS and DWL with and without 1st Degree Price Discrimination. Assume that:

$P=48-2Q^d$

$MC=4Q$

With Price Discrimination:

$MR=D=MC$

$48-2Q=4Q$

$8=Q$ (PC Q)

Min $P=48-2Q$

Min $P=48-2(8)=32$ (PC P)

Without:

$MR=MC$

$48-4Q=4Q$

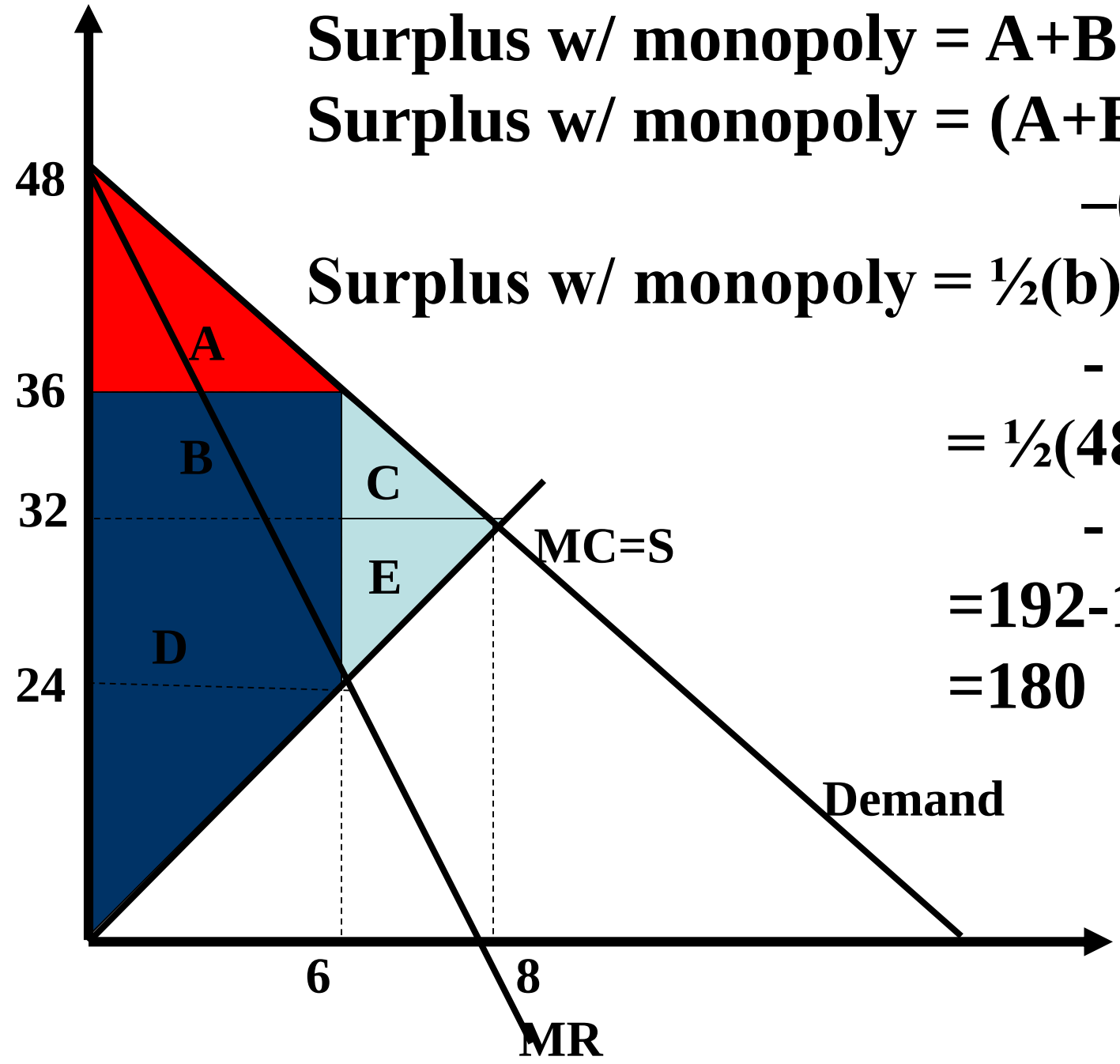
$6=Q$

$P=48-2Q$

$P=48-2(6)=36$

$MC=4Q$

$MC=4(6)=24$



Surplus w/ monopoly = A+B+D

Surplus w/ monopoly = (A+B+D+C+E) –(C+E)

Surplus w/ monopoly = ½(b)(h) - ½(b)(h)

= ½(48)(8) - ½(12)(2)

=192-12

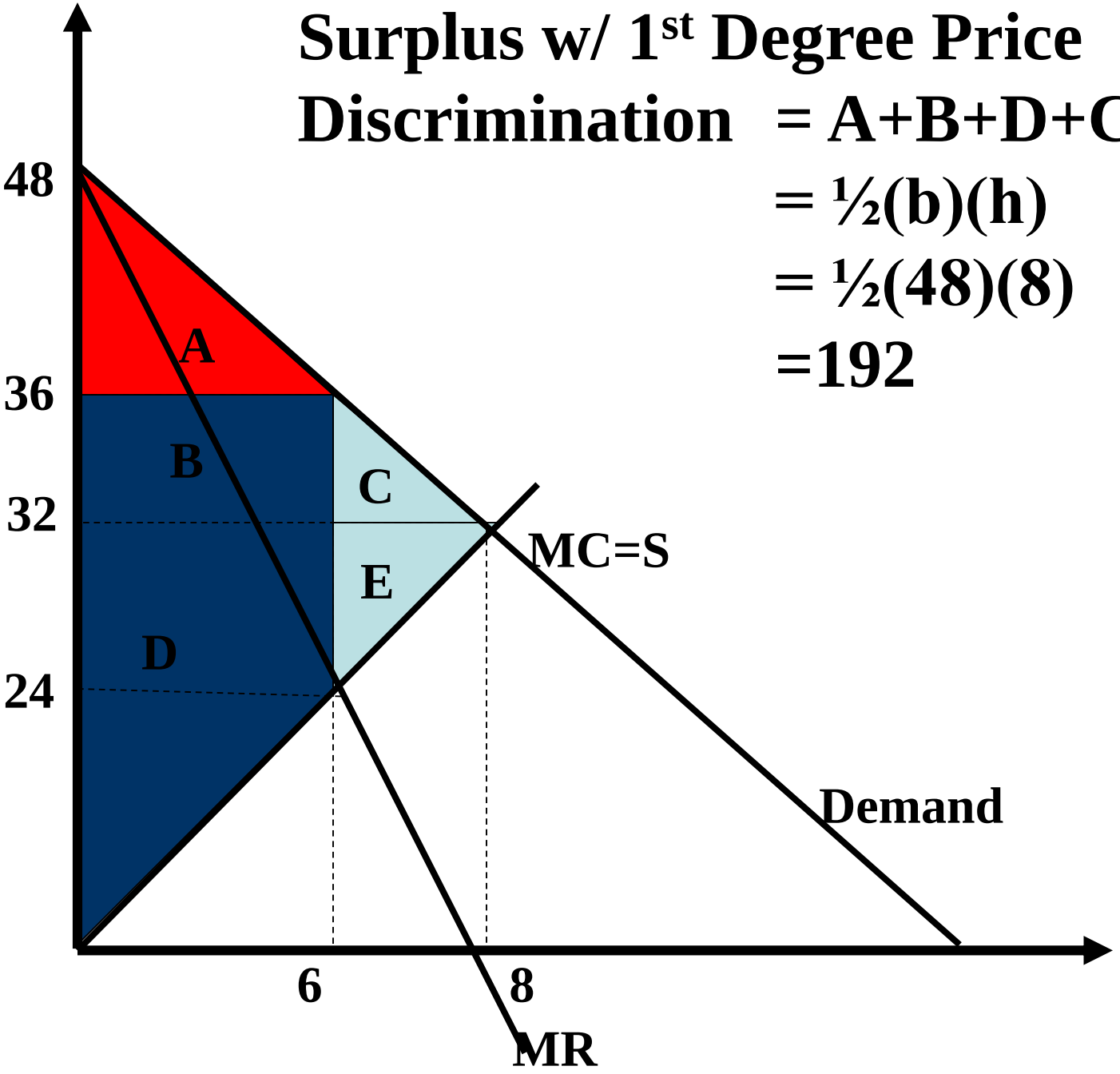
=180

Surplus w/ 1st Degree Price Discrimination = A+B+D+C+E

= ½(b)(h)

= ½(48)(8)

=192



2nd Degree Price Discrimination

- Second degree price discrimination deals with price discounts:
  -Selling at a discount price after a certain number of goods are purchased

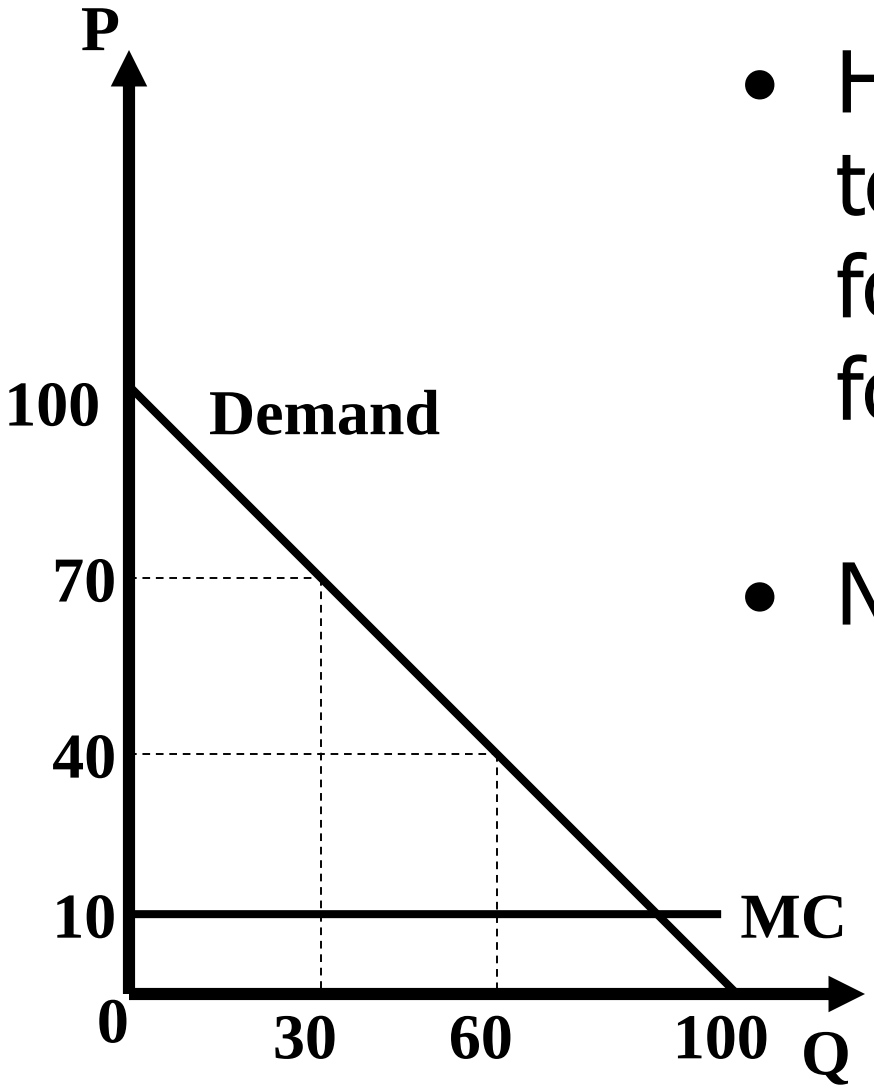
- Second degree price discrimination also involves offering separate membership and per unit price plans that consumers CHOOSE between
  -ie: Cell phones, club memberships, bus pass

2nd Degree: Block Pricing

- In block pricing the first "block" of goods is sold at a given price, and the next "block" of goods is sold at a lower price
- A consumer pays P_1 for the first Q_1 good, then P_2 for any goods above Q_1

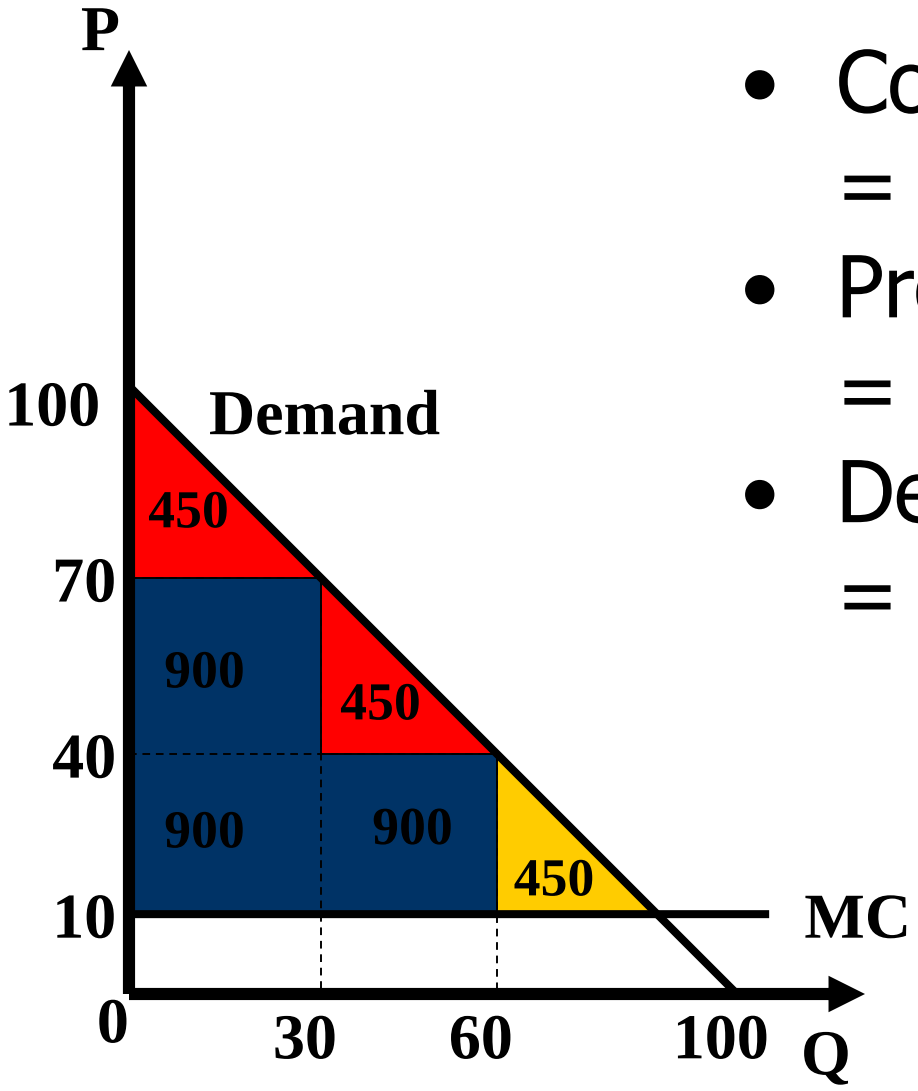
- There can be more than 2 different blocks of prices

Block Pricing



- Here a price of 70 applies to the first 30 goods, followed by a price of 40 for the next 30 goods
- Note: $P=100-Q^d$

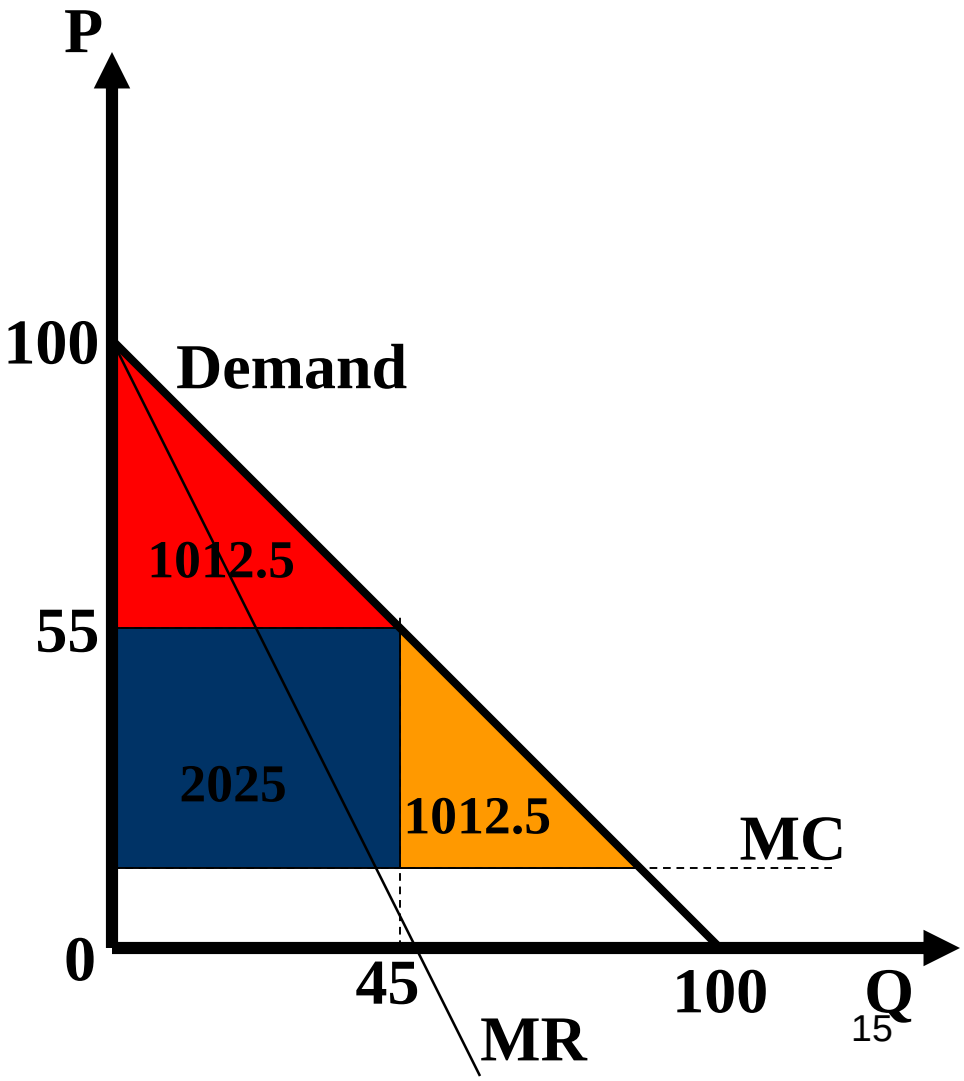
Block Pricing and Surplus



- Consumer Surplus (Red) = 900
- Producer Surplus (Blue) = 2700
- Deadweight Loss (Gold) = 450

Normal Monopoly Surplus

- Consumer Surplus (Red) = 1012.5
- Producer Surplus (Blue) = 2025
- Deadweight Loss (Gold) = 1012.5



2nd Degree: Block Pricing

- In this example quantity discounts increased producer surplus
- Since the quantity sold on the market also increased, DWL decreased compared to the typical monopoly

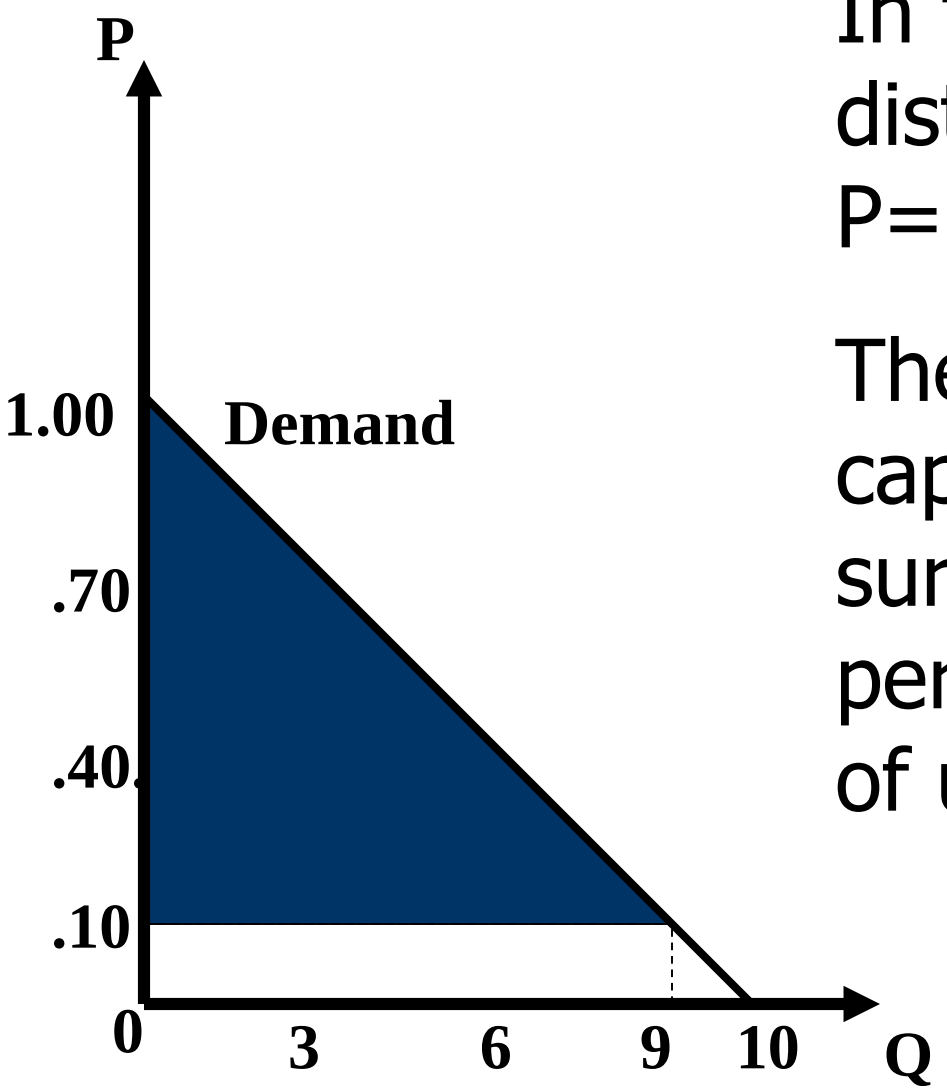
- Note that if prices decrease due to a decreasing MC, this is not considered price discrimination

2nd Degree: Subscription and Usage

- Some goods (such as cell phones or music clubs) carry a plan/membership fee and a cost per unit/use
- Often multiple plans exist, each with different fixed and variable fees

- Multiple plans often exist in order for the monopolist to price discriminate

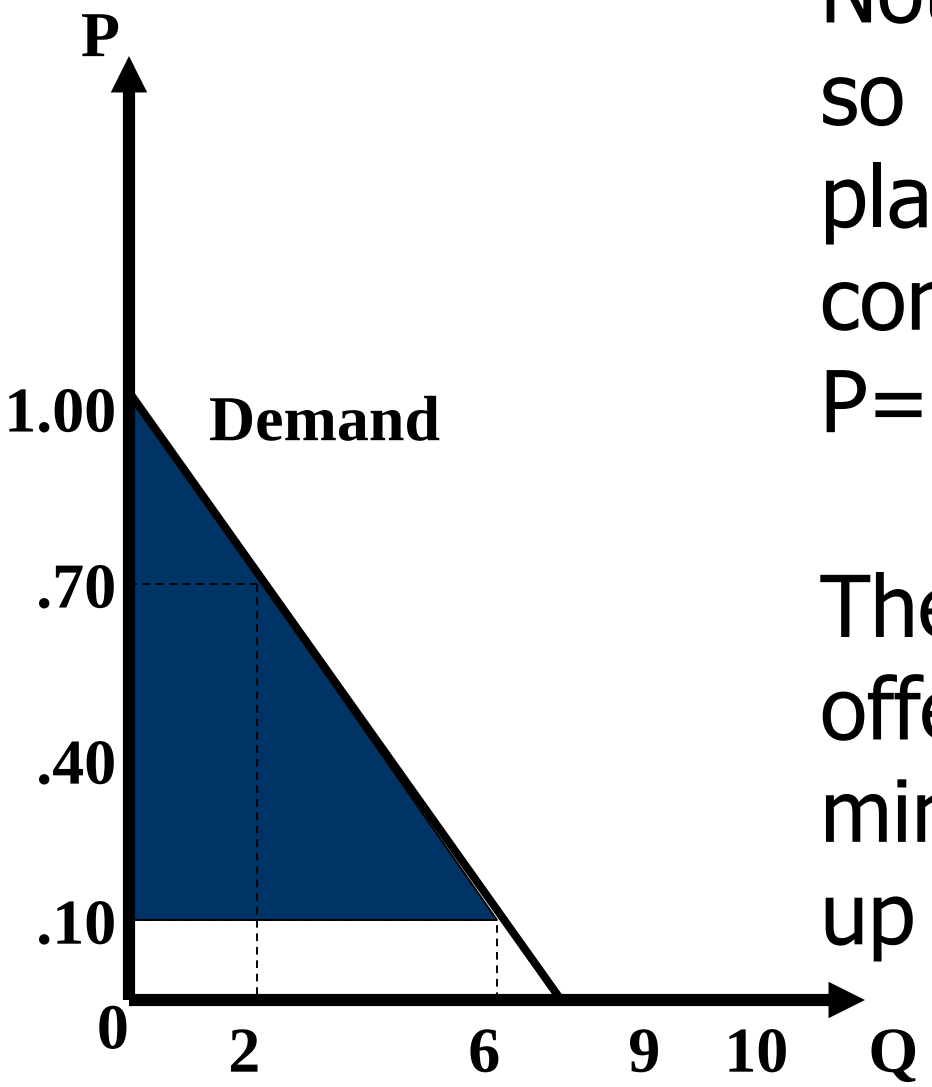
Membership and Per Unit Costs



In this market for long distance, MC=$0.10, P=$0.10, and CS=$4.05.

Therefore a firm could capture most consumer surplus by charging $0.10 per minute plus a plan fee of up to $4.05.

Membership and Per Unit Costs



Not all consumers are alike, so the firm offers different plans for different consumers. Here if P=$0.70, CS=$0.30.

Therefore the firm could offer a price of $0.70 per minute with a plan fee of up to $0.30.

Effective Subscription and Usage

- Price plans are only effective price discrimination if different consumers automatically choose different plans

- Assume 2 customers:
  - Customer A – makes 30 long distance calls
  - Customer B – makes 100 long distance calls
- Assume 2 plans:
  - Plan I - $1 per call, $50 plan fee
  - Plan II - $2 per call

Effective Subscription and Usage

- Customer A
  - -Spends $80 on plan I
  - -Spends $60 on plan II
  - -Picks plan II
- Customer B
  - -Spends $150 on plan I
  - -Spends $200 on plan II
  - -Picks plan I

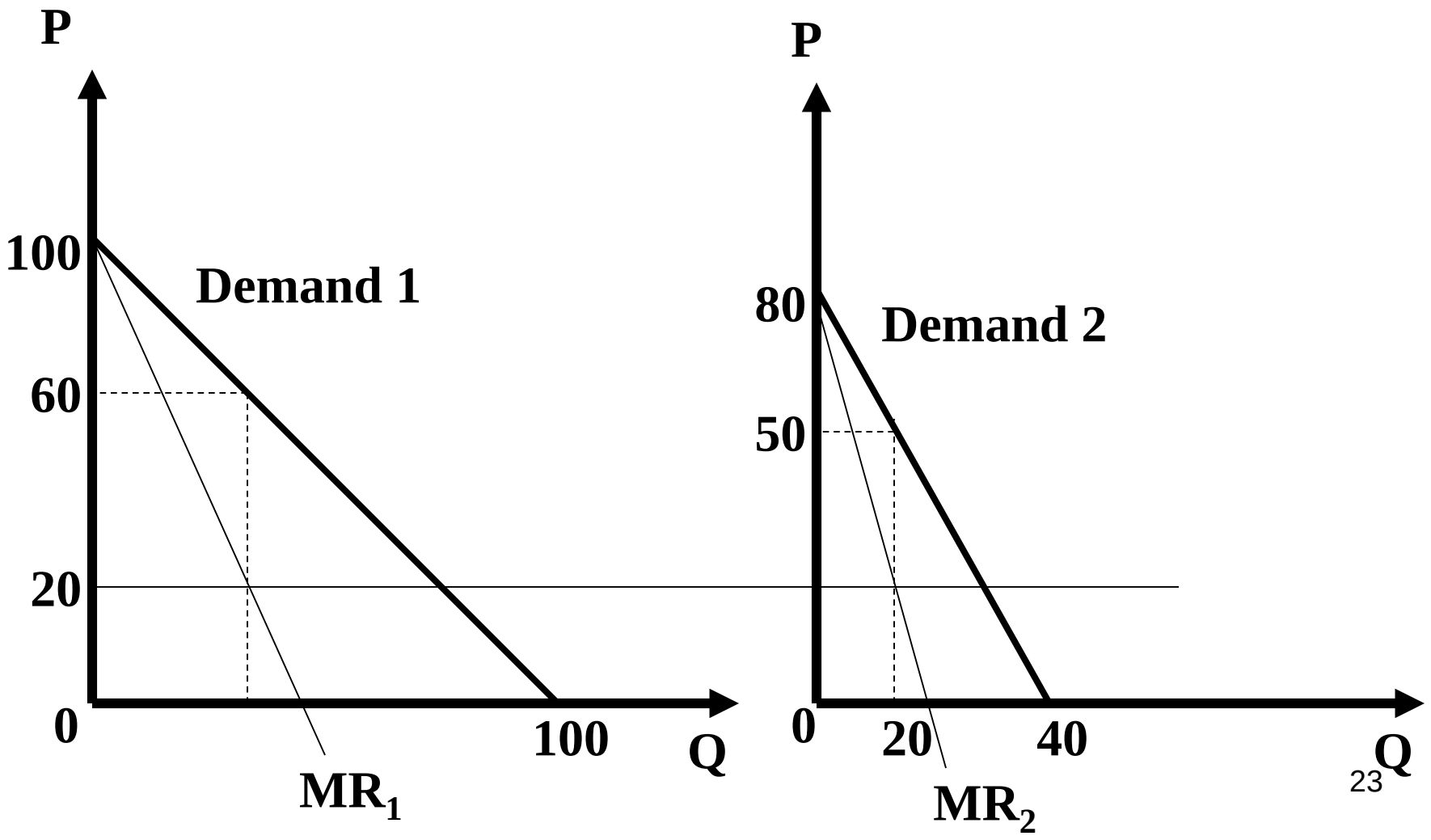
- Effective Price Discrimination

3rd Degree Price Discrimination

- Third degree price discrimination charges different prices to different consumer groups, or segments of society (each with different demand schedules)

- Examples:
  - -Student and seniors movie prices
  - -Regular and farm gasoline
  - -Bus passes
  - -"Customer Appreciation Days"
  - -Tuesday deals at restaurants

Third Degree Price Discrimination



Screening

- In order to price discriminate, the firm must separate different demand schedules

- SCREENING separates consumers based on characteristics that are:
  1) Easily identified (age, status)
  2) Strongly related to a useful consumer characteristic (willingness to pay, elasticity of demand, available income, etc.)

Age Screening

- Youth often have more time to shop around and lower disposable income
  - -Different demand = different price

- Seniors are often more sensitive to price
  - -Different demand = different price

- Identity cards can verify age and prevent arbitrage (reselling of goods)

Time Screening

- Products are more expensive when first released; those who MUST have a new good (ie: Tickle Me Elmo) have different demands than those who can wait
- Cell phone calls are cheaper (often free) at night, due to different types of consumers
  - -Business calls during day
  - -Personal calls at night
- Different consumer groups visit restaurants Fridays compared to Tuesdays ->Tuesday dinner specials

Coupons and Rebates

- Coupons and Rebates take time to collect or redeem
- Consumers willing to use coupons and rebates are more price sensitive
- Different price elasticities = different prices

- In general, rebates and discounts are offered to consumers who are more price sensitive (elastic demands)

Quality and Convenience

- Another way companies can offer essentially the same product is through quality and convenience differences.

- Higher willingness to pay will want to buy higher quality

- Higher willingness to pay will want higher convenience

Quality and Convenience

- Quality Examples: Cars (luxury and base), Computers (with or without a dedicated graphics card), Software (Windows 8, Windows 8.1, Windows 8.1 Pro)

- Convenience Examples: Last minute ticket sales, customer support, cancellation ability (ie: airplane tickets)

Price Discrimination

First Degree

-Each consumer pays their maximum willingness to pay

Second Degree

-Consumers sort themselves into different price categories (quantity discounts or plans)

Third Degree

-Firms sort consumers into different price categories

Tie-In Sales

A firm can capture consumer surplus by allowing consumers to purchase one good (*tying* product) only if it agrees to buy another (*tied* product

ie: Buy an hp printer, and be forced to buy hp ink

ie: Buying an ipod and being forced to use itunes

ie: Buying an Iphone and being forced to sign up for a data plan

ie: Warranties being voided if off-brand parts or off-brand services are used (Weak Tie-In Sale)

Tie-In Sales

Tie in sales extends market power from the TYING product (ie: ipad) to the TIED product (ie: itunes)

ie: itunes can have higher prices than it could if the market was competitive

-another way of using tie-in sales is by making guarantees invalid if non-brand parts or components are used

Bundling

Bundling is a type of tie in where a consumer can only buy good A if it also buys good B simultaneously.

- TV channel packages
- Furnaces and Furnace installation
- Cars with passenger air bags
- Laptop with webcam

Bundling forces consumers to buy all goods when they may not buy them individually;

Bundling Example

Two people are looking to replace their furnace. The handyman realizes the value of a new furnace, and would pay up to $4000 for one, but is only willing to pay $1000 for installation.

A typical homeowner doesn't realize all the benefits of a new furnace, so would pay $3000 for one, but has no installation experience and would pay $2000 for installation.

A firm's costs are $2000 for the furnace and $500 for installation

Bundling Example

At individual prices: (f=furnace, i=installation)
P_f=\$3000, sells two furnaces for \$2000 profit
P_f=\$4000, sells one furnace for \$2000 profit

P_i=\$1000, sells two installs for \$1000 profit
P_i=\$2000, sells one install for \$1500 profit

At a bundled price:
P_b=\$5000, sells two bundles for \$5000 profit

Which is why it is hard to buy a furnace without a furnace install bundled in.

Bundling Notes

Bundling is only possible if customers' demands are *negatively correlated.*

That is, if consumers are willing to pay more for different goods.

(Note that in the above example, both people may be technically indifferent between buying and not buying the various goods at listed prices.

To ensure the consumer buys, the goods need to be priced slightly below their willingness to pay, ie: Bundle price of $4999.)

Mixed Bundling

Sometimes a firm can increase profits by offering a bundle AND individual items.

This can attract customers who are uninterested in the bundle.

Consider customer C who would pay $4500 for a furnace, but only $250 for installation.

He wouldn't buy the bundle, but he would buy a furnace for $4499, giving the firm $2499 profit.

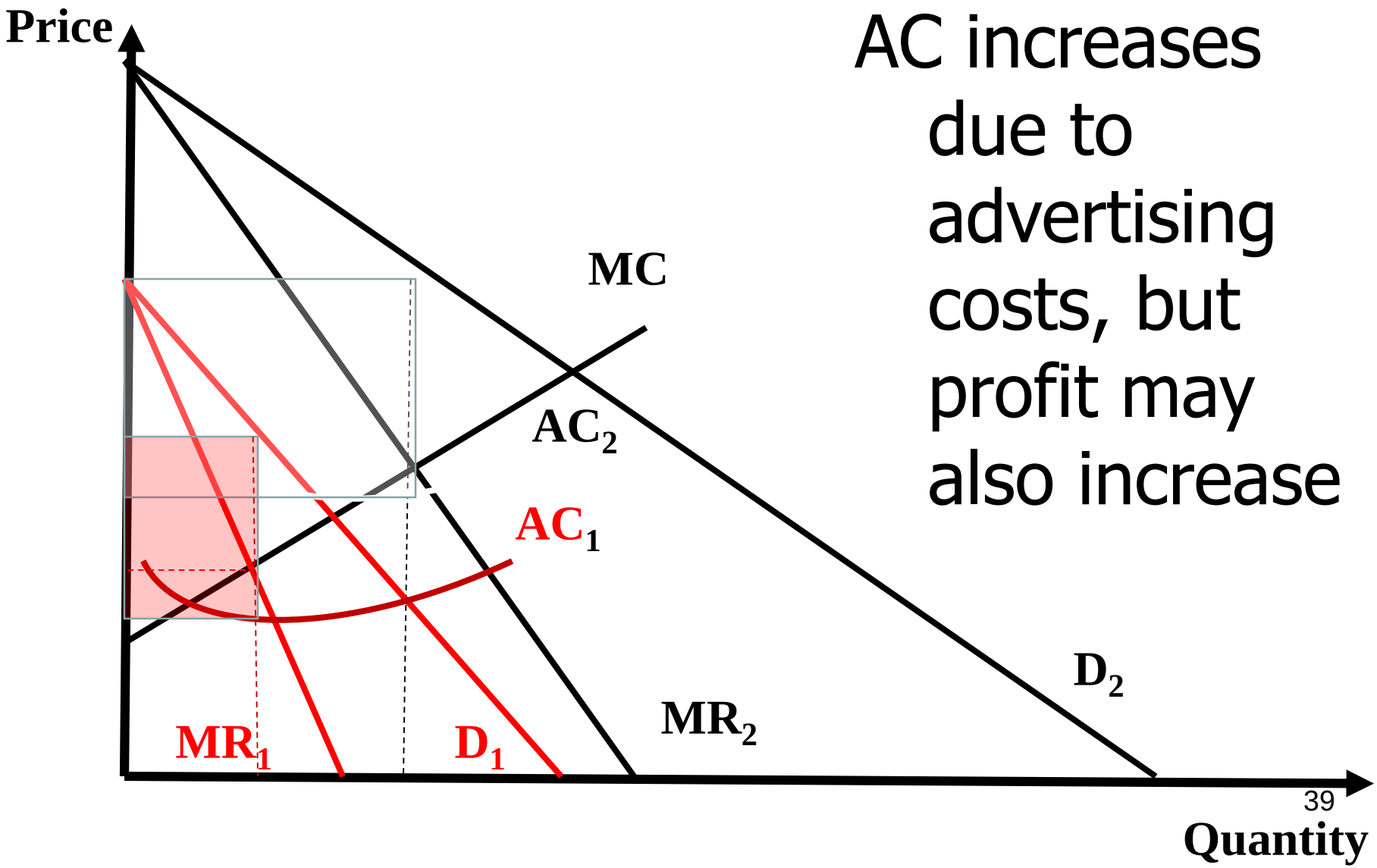
Note that neither other consumer would want the furnace for that price; they'd prefer the bundle.

Advertising

Advertising is an example of a NONPRICE strategy a firm can use to increase profits.

Advertising carries a cost, but also shifts out the demand curve, allowing for greater sales at a higher price:

Advertising



AC increases due to advertising costs, but profit may also increase

Advertising

How much should a firm advertise?

A firm should advertise until
$MR_{advertising}=MC_{advertising}$

Note that not all firms benefit from advertising (ie: electricity monopoly can't really increase electricity demand through advertising)

Summary

- Price Discrimination can occur when a firm
  - Has Market Power
  - Can distinguish between consumers
  - Can prevent resale
- First Degree Price Discrimination charges the maximum to everyone
- Second Degree Price Discrimination allows consumers to sort themselves into different prices

Summary

- Third Degree Price Discrimination allows the firm to sort consumers into different prices
- Price discrimination DECREASES deadweight loss
- Tie-in sales and bundling increases the demand for individual goods that are grouped together, thus increasing profits
- Advertising increases costs and demand
  - And may increase profits

Summary

- Your professor very much enjoyed teaching you this term, and wish you all the best in your future

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