Intermediate Microeconomics (Fall 2023)
Lecture 9
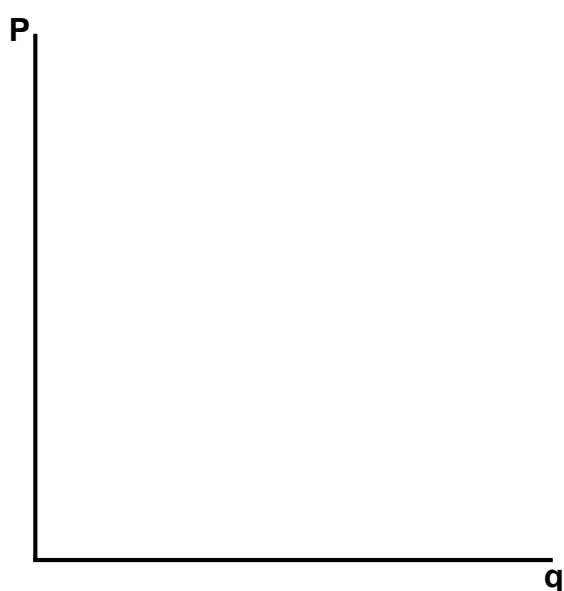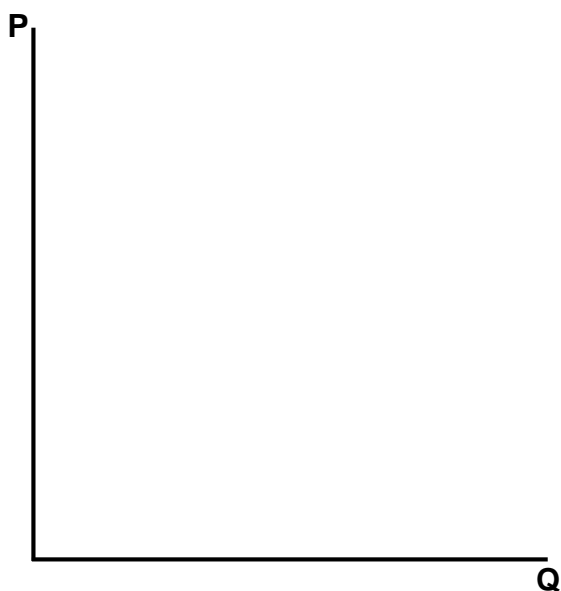**Different Forms of Market**

Part I

Perfect Competition (e.g., market of _____)

- **A perfectly competitive firm is a** _____

- **MR in Perfect Competition:** _____

- **Shape of the Demand Curve for a Perfectly Competitive Firm** – _____
  (_____).

| Market | Perfectly Competitive Firm |

- D: _____, i.e., _____

- d: _____

- Q: _____, i.e., the _____
  of the _____

- q: _____, i.e., the _____
  _____ by the _____

- **Perfect Competition in the Short-Run**

    o **Profit Maximization**

        For a perfectly competitive firm, to find out the _____

        (_____) to _____:

Cost (P)

Output (Q)

Exercise 1

A market is governed by perfect competition. Cost function of a firm in this market is given by $C(q) = 15 + q^2$, and market price $P = \$25$. Calculate the optimal quantity of production for this firm and the corresponding profit.

- **Perfect Competition in the Long-Run**

  o **Rules of Thumb**

    ▪ If _____

      ⇒ _____ of _____

      ⇒ _____ to _____

      ⇒ _____

      ⇒ _____

    ▪ If _____

      ⇒ _____ of _____

      ⇒ _____ to _____

      ⇒ _____

      ⇒ _____

    ▪ _____

      ⇒ _____ or _____ the _____

      ⇒ _____

- **Perfect Competition in the Long-Run**

  o **Rules of Thumb**

- **Perfectly Competitive Equilibrium**

P

Q

- Perfectly Competitive Equilibrium: Produce at Point _____, where

  _____

- At Point _____, there is _____
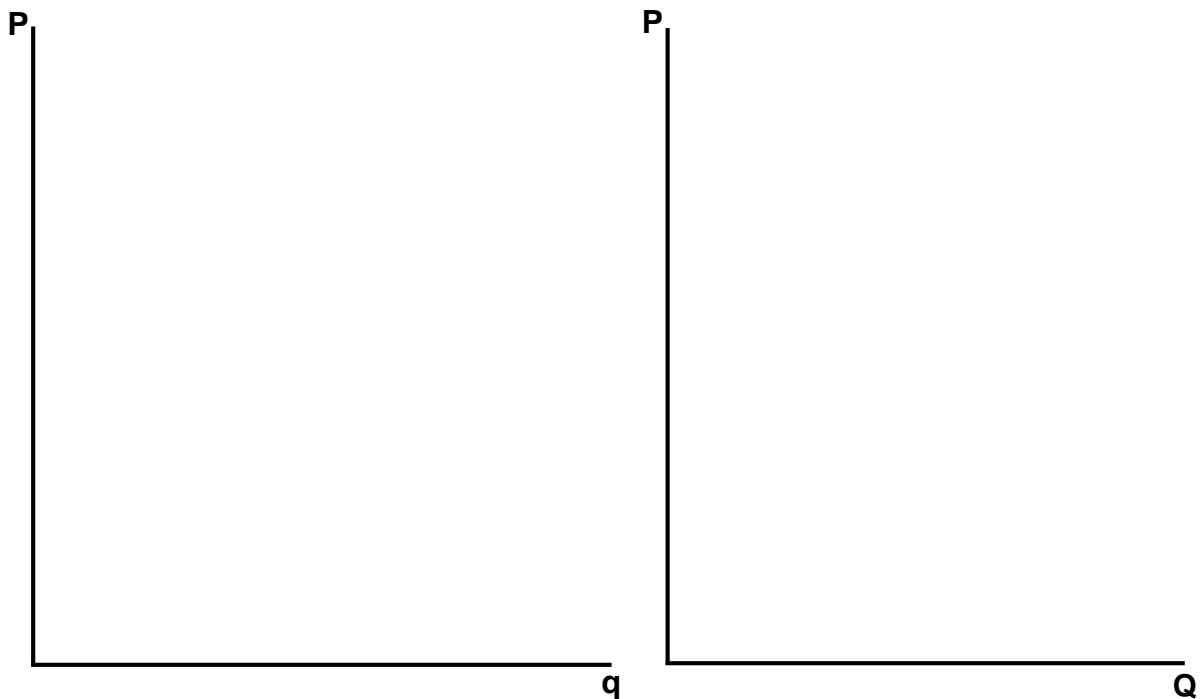
  ⇒ _____

  ⇒ _____

       o   **Long-Run Supply Curve of a Perfectly Competitive Market (LRS)**

          ▪   **Constant Cost Industry** – Firms in the industry can _____

_____

the _____ to _____.

Example 1

      Assume there are 50 firms in the industry at the beginning, and in perfectly competitive equilibrium, each firm produces 40 units of the product. Suppose there is an increase in demand.

P   P

                                      q   Q

      When _____, _____ to

_____ temporarily. A _____ induces _____

to _____ the _____, and thus, _____.

In this _____ industry, firms can buy as much inputs as needed

without causing the input prices to go up. Therefore, _____ curve _____ the

_____ and _____ for

_____ the _____. There are

_____ in this _____ that _____ in the

_____ way as the _____ do, i.e., after

_____, _____ firms are in the industry now.

- **Increasing Cost Industry** – _____

  of _____ causes _____

  to _____.

Example 2

P

Q

The market starts at _____. When demand goes up, price increases to P_1 temporarily. A higher price induces new firms to enter the market, and thus, supply increases. However, the _____ in _____ causes the _____ for _____ to _____, and therefore, input prices go up. With _____, the _____ of the _____ curve is now at _____. Therefore, _____ will _____ to an _____ to make the _____ to _____. Instead, the _____ will be _____ and _____ will be the _____.

Part II

Monopoly – _____ of a good with _____

_____ (e.g., market of _____).

- **Sources of Monopoly Power**

  - _____

    (_____)

    - Natural Monopoly – When the _____ of a _____

      can _____

      if _____ are to _____ at

      _____, e.g.,

      the _____ of _____

      (note: _____ the _____ of

      _____,

      but the _____), such as

      _____, _____,

      _____, _____.

  - _____

    (_____),

    e.g., _____

  - _____ to _____

    - _____ of _____ and

      _____, e.g., _____,

      _____, _____.

    - _____ of an _____

      _____ or _____.

    - _____ with _____

      _____, e.g., _____, _____.

- **While the perfectly competitive firm is a " _____ ",
  the monopolist is a " _____."**

  - The **crucial** difference between perfect competition and monopoly:

    _____.

- **Demand Curve of a Monopolist** – The monopolist faces a _____ demand curve, because its demand curve is the _____ demand curve.

P

Q

- **Demand Curve of a Monopolist** – The monopolist faces a

- **MR of a Monopolist:** _____

  o MR = _____

    = _____

    = _____

    = _____

    ▪ Since _____

      ⇒ _____

      ⇒ _____ curve is _____ the _____ curve

  o Suppose the demand is given by _____

    ⇒ P = _____

    ⇒ TR = _____

      = _____

    ⇒ MR = _____

      = _____

    ⇒ _____ curve is _____ as _____ as the _____ curve

    ▪ When _____, _____

      ⇒ _____ curve and _____ curve _____

        at _____

➢ **Figure of the MR and Demand Curves of a Monopolist**

P

Q

- **Profit Maximization by a Single-Price Monopolist**

    o **Single-Price Monopoly** – The monopolist must _____

       of its _____ for the _____

       to _____ its _____.

    o **Profit Maximization**

       ① Look for where _____ to _____

          the _____.

       ② To find the _____ that the monopolist _____,

          use the _____ on the _____

          where the _____ is _____ to _____.

       ③ Profit-maximization under monopoly: _____.

P

Q

       ▪ Rule of Thumb for Monopoly: _____

       ➢ To remember those two rules of thumb:

          ① _____

          ② _____

Exercise 2

A market is governed by monopoly. Demand function of this product is given by $P = 500 - 4Q$, and cost function of this monopolistic firm is given by $C(Q) = 100 + Q^2$. Calculate the quantity that will be produced, the price set by this monopolistic firm and the corresponding profit this monopolistic firm will earn.

Exercise 3

Barbara is a producer in a monopoly industry. Her total revenue, total cost and the demand for this product are given by

$Q = 160 - 4P$
$TR = 40Q - 0.25Q^2$
$TC = 4Q$

To maximize profit, how much output should Barbara produce?

A. 0
B. 22
C. 56
D. 72
E. None of the above.

- **Monopoly Power** – The ability to _____ a
  _____ than _____
  (_____ of _____).

  o **The Rule for Monopoly Pricing**

  Since _____

  $\Rightarrow$ It is usually written as _____

  For a monopolist, _____

  $\Rightarrow$ _____

  $\Rightarrow$ _____

- **Note**

  ❖ A monopolist will _____ to operate

    where the _____ curve is _____

    * Reason I:

      If _____

      ⇒ _____

      ⇒ _____

      ⇒ _____

      ⇒ Any point where _____ be

        a _____ for a monopolist

      ⇒ A point that yields maximum profit can _____ occur

        where _____

    * Reason II:

      For _____

      ⇒ If _____ is _____

      ⇒ _____ and _____

      ⇒ _____

      ⇒ A monopolist could always _____ its _____

        by _____

      ⇒ Any point where _____ be

        a _____ for a monopolist

      ⇒ A point that yields maximum profit can _____ occur

        where _____

  ❖ In a perfectly competitive market, the firm faces a _____ demand curve

    ⇒ Demand is _____

    ⇒ _____

    ⇒ A perfectly competitive firm would set the price _____ to

      the _____

- o **Markup Pricing** – The market _____ is a _____ over _____, where the amount of the markup depends on the price _____ of _____.

  ⇒ The markup is given by _____

  - ▪ Since the monopolist always operates where the demand is _____

    ⇒ _____

    ⇒ The _____ is _____ than _____

- **Profit Maximization by a Discriminating Monopolist**

  ➢ **Price Discrimination** – _____

  of output at _____.

  o **First-Degree Price Discrimination (also called Perfect Price Discrimination)** – The
  monopolist sells different units of output for different prices and these prices may
  _____.

  ⊠ Assume constant MC for simplicity.

P

Q

  - _____ of the good is sold to the _____

    who _____ it _____, at the
    _____ that this individual is
    _____.

  - _____

  - _____

    ⇒ _____

    gets the _____

o **Second-Degree Price Discrimination (also called Nonlinear Pricing)** – The monopolist sells different units of output for different prices, but _____ individual who _____ the _____ of the good _____ the _____, e.g., bulk discounts.

- _____ the _____ of the good _____, e.g., public utilities: the price per unit of electricity often depends on how much is bought.

- Reasons for the Second-Degree Price Discrimination

  ⇒ For the first-degree price discrimination, to set the _____ _____, the monopolist has to know the _____ curves of the consumers, i.e., the _____ of _____ person.

  ⇒ The _____ person can _____ to be a _____ person.

  ⇒ The monopolist gets around this problem by offering _____ _____ in the market: one _____ toward the _____ person, the other toward the _____ person.

  ⇒ Consumers are _____ to _____ the package _____ for them, i.e., the monopolist constructs price-quantity packages that give the consumers an incentive to _____.

- Figures for the Second-Degree Price Discrimination

I: Self-Selection Problem

P

Q

- ❖ _____: demand curve for a _____ person –

  _____

- ❖ _____: demand curve for a _____ person –

  _____

- ❖ Assume _____

❖ The monopolist would like to charge _____
his _____ for _____ of the product to
capture _____ the _____ and generate
the _____

   ∗ For Consumer _____, the monopolist would like to sell _____
     units at _____
     to _____

       ⇒ _____ from Consumer _____ = _____

   ∗ For Consumer _____, the monopolist would like to sell _____
     units at aggregate prices equal to Area _____

       ⇒ _____ from Consumer _____ = _____

   ⇒ These price-quantity combinations are _____
     with _____: Consumer _____
     would find it _____ to _____ the
     _____ and _____
     – this would leave him with a _____
     to _____, which is _____ than the
     _____ he would get if he chose _____

   ⇒ The monopolist can offer _____ units at a price of _____:
     Consumer _____ would find it optimal to choose _____
     package as it yields a _____ of _____
     for him – just what he would _____ if he chose _____

   ⇒ The monopolist gets paid _____ instead of _____

   ⇒ It yields _____ to the
     _____ than it would get by offering
     _____ price-quantity combination

II: The Monopolist Reduces the Output Targeted for Consumer 1

P

Q
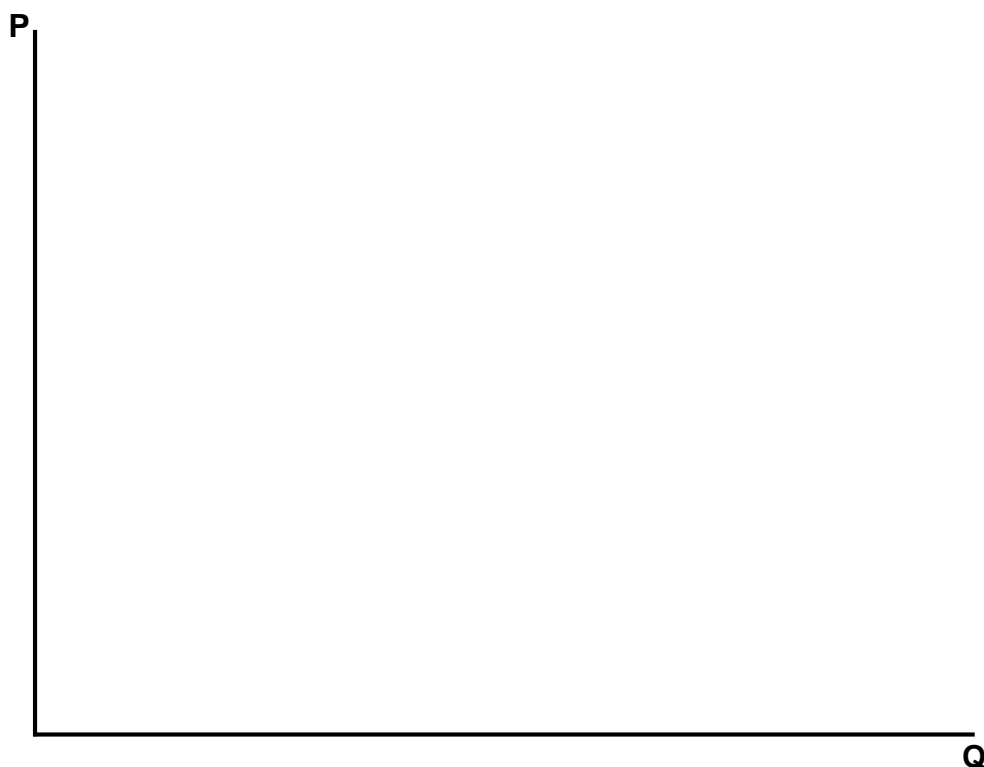
- ❖ The monopolist can _____ to
  _____

  - ⇒ The monopolist can offer Consumer _____
    than _____ at a _____ than
    the Area _____ in Panel _____: the Area _____ in Panel _____

  - ⇒ The monopolist's _____ on Consumer _____
    is _____ by the Area _____

  - ⇒ Consumer _____'s package is now _____
    to Consumer _____

  - ⇒ The monopolist can now charge _____ to Consumer _____
    for _____: the Area _____ in Panel _____

  - ⇒ The monopolist's _____ on Consumer _____
    is _____ by the Area _____

  - ⇒ The monopolist's _____
    by the Area _____

III: The Profit-Maximizing Solution

P

Q

❖ Continuing in the previous step, the monopolist will _____
the amount offered to Consumer _____ up to the point where the
_____ on Consumer _____ due to a
_____ in _____ just
_____ the _____ on Consumer _____

⇒ The _____ and _____ of quantity reduction just balance

⇒ _____: the amount that the monopolist offers to Consumer _____

⇒ ∗ Consumer ____ chooses _____ and is charged _____

   ∗ Consumer ____ chooses _____ and is charged _____

⇒ ∗ Consumer _____ ends up with a _____

   ∗ Consumer _____ ends up with a _____ of _____
   – just what he would _____ if he chose to consume _____

o **Third-Degree Price Discrimination** – The monopolist sells _____

to _____ for

_____, but

_____ of output sold to a

_____ sells for the

_____: the most _____

form of price discrimination, e.g., student discounts, senior citizens' discounts, etc.

▪ Suppose that the monopolist is able to _____ two groups of

people and can sell an item to _____ group at a _____

price, and suppose that the consumers in _____ market are

_____ to _____ the good.

▪ Set up

❖ _____: the inverse demand function of _____

– _____

❖ _____: the inverse demand function of _____

– _____

❖ _____: the cost of producing output

❖ _____: the price elasticity of demand in

Market _____, evaluated at the profit-maximizing choices of output

❖ _____: the price elasticity of demand in

Market _____, evaluated at the profit-maximizing choices of output

- The monopolist maximizes profit:

⇒ Optimal solution:

* _____ is the _____ in each market

⇒ _____ in _____ market must also be the _____

⇒ If the _____ in Market _____ exceeded _____,
the monopolist would _____ to _____
output in Market _____, and similarly for Market _____

⇒ Plug in elasticity:

- Suppose _____

    ⇒ _____

    ⇒ _____

    ⇒ The market with the _____ must have the
        _____ price _____ of demand

    ⇒ A firm that price discriminates will set a _____ price for the
        _____ group and a _____
        price for the group that is relatively _____,
        e.g., students and senior citizens are _____ sensitive to price than
        the average consumer and thus have _____
        demand for the relevant region of prices, and therefore, the firm will offer
        student discounts and senior citizens' discounts

    ⇒ The firm _____ its _____

Example 3: Linear Demand Curves

A firm faces two markets with linear demand curves:

$$x_1 = a - bp_1$$

$$x_2 = c - dp_2$$

Suppose for simplicity that MC = 0.

1) If the firm is allowed to price discriminate, it will produce where _____
   in each market

   $\Rightarrow$

   $$\begin{cases} x_1^* = \text{_____} \\ \\ x_2^* = \text{_____} \end{cases}$$

   $\Rightarrow$

   $$\begin{cases} p_1^* = \text{_____} \\ \\ p_2^* = \text{_____} \end{cases}$$

   $\Rightarrow$ At a price and output combination that is _____

   _____

2) Suppose that the firm were forced to sell in both markets at the same price

   $\Rightarrow$ Demand: _____

   $\Rightarrow$ Produce _____

   $\Rightarrow$

   $$\begin{cases} x^* = \text{_____} \\ \\ p^* = \text{_____} \end{cases}$$

   $\Rightarrow$ The total output is the _____ whether or not price discrimination is allowed

   $\Rightarrow$ A special feature of the _____ demand curve and does not hold in general

> ➢ However, there is an important exception to this statement.

⇒ By assumption, when the monopolist chooses the optimal single price, it will sell a _____ of output in _____ market.

⇒ It may very well happen that at the profit-maximizing price, the monopolist will sell output to _____ of the markets.

⇒ For two linear demand curves:

P

Q

❖ Since MC is assumed to be zero, the monopolist will want to operate at a point where the price elasticity of demand is _____, i.e., _____ down the market demand curve.

⇒ The price _____ is a profit-maximizing price.

⇒ If the demand in Market _____ is very _____, the monopolist may _____ to _____ its _____ any further in order to _____ to this market.

⇒ The monopolist will end up _____ to the _____.

✓ If the monopolist can charge only one price, it will charge _____, and sell _____ to Market _____; if price discrimination is allowed, it will also sell at price _____ to Market _____.

⇒ The monopolist will find it in its interest to sell to _____ if it can charge a different price in each one.

⇒ Allowing price discrimination will unambiguously _____ _____.

Exercise 4

Suppose that a monopolist faces two markets with demand curves given by

$$D_1(p_1) = 100 - p_1$$
$$D_2(p_2) = 100 - 2p_2$$

Assume that the monopolist's MC is constant at $20 a unit.

1) If the monopolist can price discriminate, what price should it charge in each market in order to maximize profit?

2) If the monopolist cannot price discriminate, what price should it charge?

Part III

Monopolistic Competition – A type of _____
(e.g., Coca-Cola: _____ produces Coca-Cola, but the
Coca-Cola firm still has to _____ with other producers of soft drinks).

- **Characteristics of Monopolistic Competition**

    o _____, _____
        _____ but _____
        (e.g., _____ golf club of _____)

    o _____ and _____

    o _____

    o _____ in the _____

- **Two Key Features of Monopolistic Competition**

  - _____

    by _____

    ⇒ Firms are able to _____

      over the _____ they _____

      for their _____.

      ▪ The market is _____ a

        _____ one.

        ⇒ Firms _____ have to _____ the market price.

        ⇒ By _____ their _____, firms

          _____

          to _____.

      ▪ These firms are _____.

        ⇒ They are _____ the _____ firm that

          produces _____ of product.

        ⇒ They _____ charge _____

          as _____ as a monopolist would.

        ⇒ They _____

          to set the _____ for their product, but

          _____ as a monopolist would have.

        ⇒ Product Differentiation – Each firm attempts to _____

          its _____ from the

          _____ in the industry.

          ⇒ The _____ it is at

            _____ its _____ from

            _____,

            the _____ it has, i.e.,

            the _____ is the demand for the product.

○ _____ of _____

⇒ The _____ for a firm _____

as _____ is produced.

⇒ Firms tend to _____ in the

_____ that are

_____.

⇒ By selling _____ of those products, the _____

for the production _____.

Exercise 5

"Differentiated" is another word for

A. identical.
B. homogeneous.
C. heterogeneous.
D. None of the above.

- **Profit Maximization by a Monopolistically Competitive Firm**

    o   In the Short-Run

P|

                                                                    Q

    o   In the Long-Run

P|

                                                                    Q

        ▪   Point A: _____.