**Intermediate Microeconomics (Fall 2023)**
**Lecture 2**
**Elasticity**

**Part I**

**Elasticity** – A measure of the _____ of
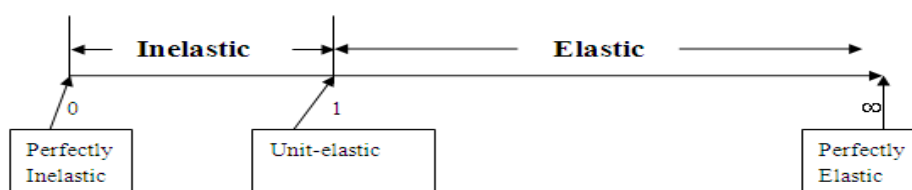_____ to _____
in _____.

- We need to assess:

**Part II**

**Own-Price Elasticity of Demand**

- **Key Points**

  o Own-price elasticity of demand is _____ due to the
    _____. Also, it is shown from the fact
    that the _____ of the _____
    is _____.

  o When _____ the own-price elasticity of demand between two
    goods, we are usually interested in their _____,
    which means that an item with own-price elasticity of demand equal to −2 is more
    _____ than an item with own-price
    elasticity of demand equal to −1, although −2 is actually a smaller number than −1.

  o Interpretation: a _____ change in the _____
    of a product will lead to a _____ change in
    _____,
    e.g., PED = −2 means that if the _____ of the product
    _____ by _____, there will be a
    _____ in
    _____.

  o You should be able to calculate the _____ variable
    given the _____ variables in the
    definition of the own-price elasticity of demand.

- **Comparison between Elastic and Inelastic**

$$\left|E_{Q_x^D, P_x}\right|$$

————————  ————————————————————

E.g., stuff with _____

_____, but can be

————————  ————————————————————  _____

_____,

such as _____,

_____.

————————  ————————————————————

E.g., _____

_____, such as

_____, _____.

E.g., stuff used for the

_____, such as

————————  ————————————————————  _____.

Inelastic          Elastic

0          1          ∞

Perfectly Inelastic          Unit-elastic          Perfectly Elastic

- **Elasticity vs. Slope**

  o   Elasticity _____ Slope

    ▪   Slope

    ▪   Elasticity

  ➢   For linear demand function

    ❖   Demand curve is a _____

      ⇒ _____ is _____

    ❖   On _____, _____ and _____ are _____

      ⇒ _____ is
      _____ for each point on a linear demand curve

    ❖   The point of unit-elastic demand is _____ down the demand curve

∗   Math Proof

Suppose _____

Vertical Intercept: _____

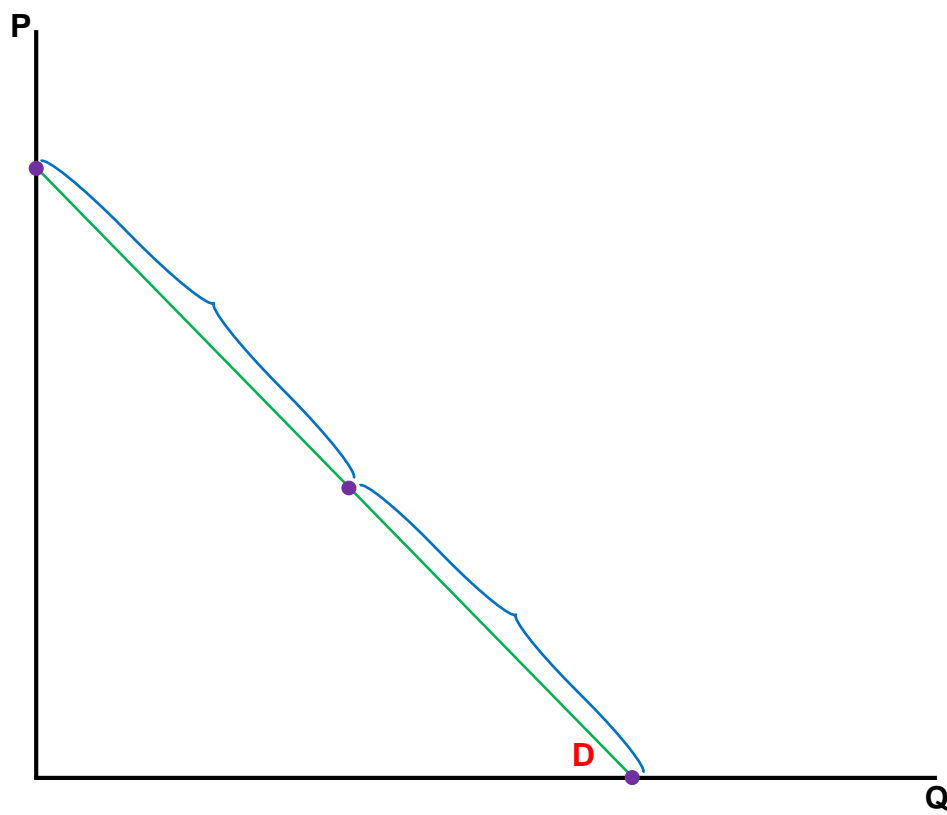Horizontal Intercept: _____

At the point of unit-elastic demand: _____

⇒   _____

⇒   _____

⇒   {

o   Slope does _____ elasticity
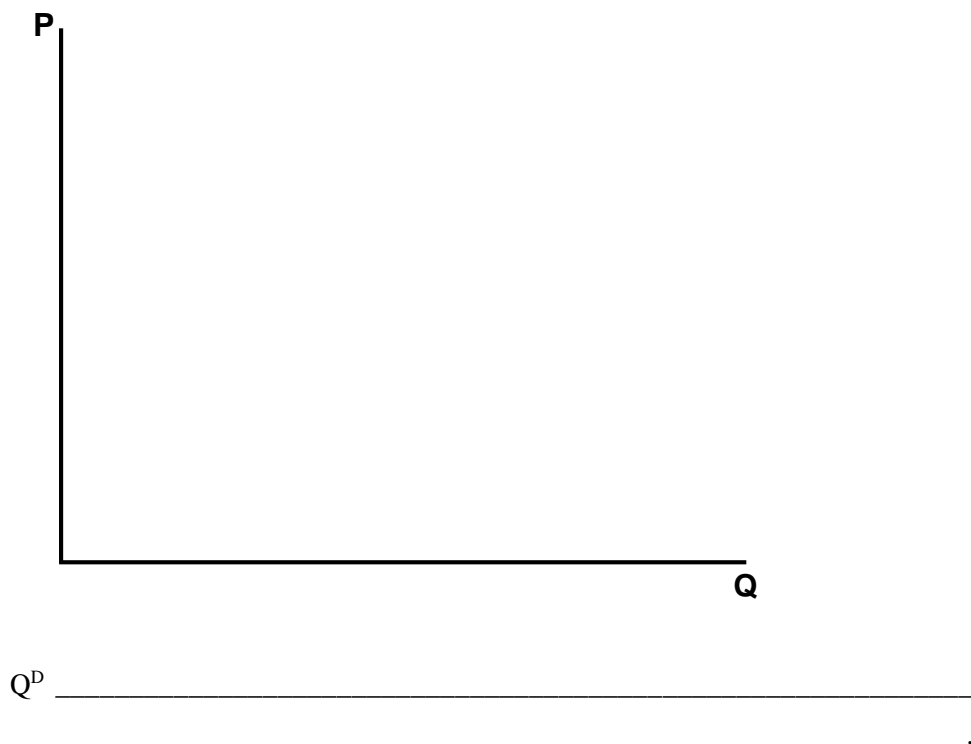
  ▪   _____ demand curve ⇒ More _____

  ▪   _____ demand curve ⇒ More _____

  ▪   Perfectly inelastic

P

Q

Q^D _____

_____.

▪ Perfectly elastic

P

Q

The law of demand: _____

⇒ For any prices _____,

$Q^D$ _____;

for any prices _____,
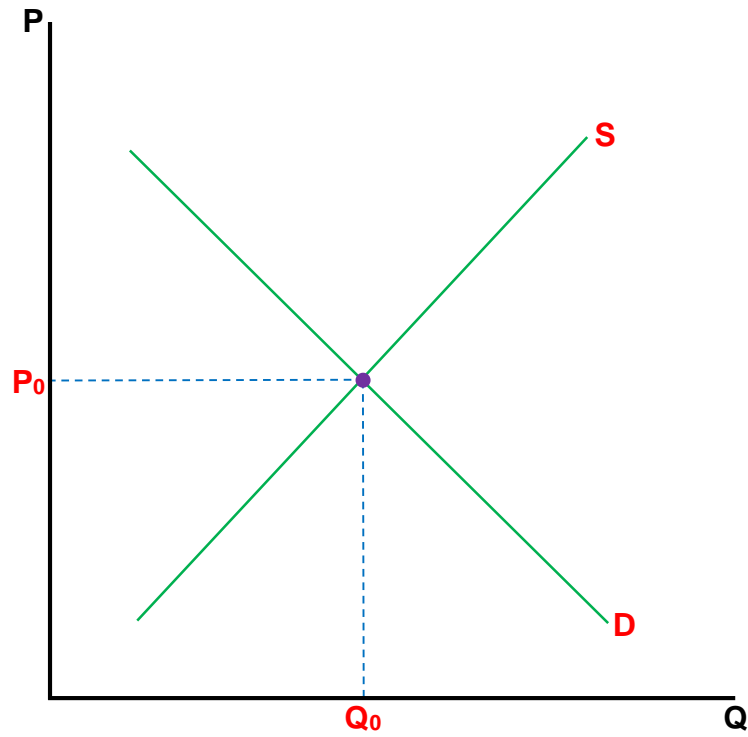
$Q^D$ _____.

*Exercise 1*

The demand function is given by $Q^D = 400 - 5P$. Find the own-price elasticity of demand at P = 70, P = 40, P = 15.

- **Relationship between Own-Price Elasticity of Demand and Total Revenue**

$$\underline{\hspace{6cm}} = \underline{\hspace{1cm}} * \underline{\hspace{1cm}} = \underline{\hspace{6cm}}$$



- o **Elastic demand**: price and total revenue move in the _____ direction.

- o **Inelastic demand**: price and total revenue move in the _____ direction.

➢   Math Proof

■   Elastic demand

⇒ _____

⇒ _____

⇒ Price and total revenue move in the _____ direction
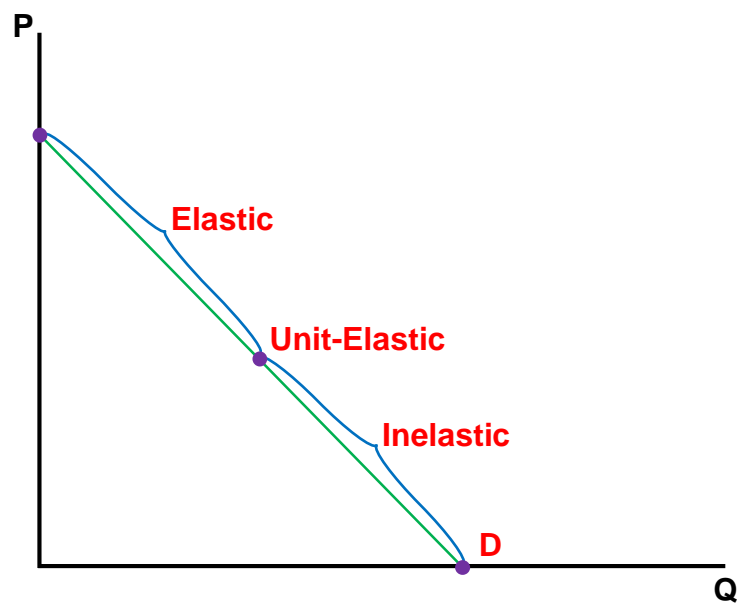
■   Inelastic demand

⇒ _____

⇒ _____

⇒ Price and total revenue move in the _____ direction

o **Unit-elastic demand**: total revenue _____.



➢ Math Proof

Suppose _____

⇒ _____

⇒ Axis of Symmetry: _____

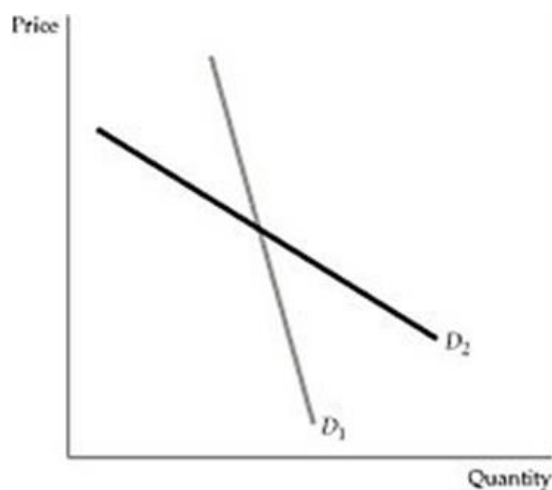- **Factors Affecting Own-Price Elasticity of Demand**

    o   Availability of _____

        ▪   _____

            ⇒ More _____

            ⇒ _____ demand curve

    o   _____

        ▪   _____

            (e.g., _____, such as _____)

            ⇒ More _____

            ⇒ _____ demand curve

        ▪   _____ (e.g., _____)

            ⇒ More _____

            ⇒ _____ demand curve

    o   _____

        ➢   _____:
            _____ is _____
            for _____ or _____ to
            _____ to the
            _____.

        ➢   _____:
            _____.
            _____ to _____
            for the _____.

        ▪   _____

            ⇒ More _____

            ⇒ _____ demand curve

        ▪   _____

            ⇒ More _____   →   <span style="color:red">People are able to _____ and</span>
            <span style="color:red">_____.</span>

            ⇒ _____ demand curve

o  _____

    ■  _____

      ⇒ More _____

      ⇒ _____ demand curve

    ■  _____

      ⇒ More _____

      ⇒ _____ demand curve

*Exercise 2*

Refer to the figure.



If close substitutes are difficult to find in the short-run, which of the demand curves in the figure best represents market demand in the short-run?

A. $D_1$
B. $D_2$
C. Both curves are short-run curves.
D. Both curves are long-run curves.

**Part III**

    **Other Types of Price Elasticity of Demand**

- **Cross-Price Elasticity of Demand**

  - _____

    ⇒ _____

    ⇒ x and y are _____

  - _____

    ⇒ _____

    ⇒ x and y are _____

- **Income Elasticity of Demand**

  - _____

    ⇒ _____

    ⇒ x is _____

  - _____

    ⇒ _____

    ⇒ x is _____

    - _____

      ⇒ 1 percent increase in _____ leads to _____

      _____

      in _____

      ⇒ x is a _____

    - _____

      ⇒ x is a _____

*Exercise 3*

The demand function is given by $Q_x^D = 1000 - 5P_x + 1.5P_y + 0.25M$. Find the own-price elasticity of demand, the cross-price elasticity of demand, the income elasticity of demand at $P_x = 150$, $P_y = 100$, $M = 2000$.

**Part IV**

**Elasticity from the Demand Function**

Interpret Coefficients in Different Functional Forms

| Functional Form | Expression | The Change in y When x Changes | Interpretation of the Coefficients |
|---|---|---|---|
| **Level-Level (Linear)** | _____ | Take total differential:<br><br>_____<br><br>$\Rightarrow$ _____ | If x increases by _____,<br><br>y will change by _____. |
| **Log-Level** | _____ | Take total differential:<br><br>_____<br><br>$\Rightarrow$ _____ | If x increases by _____,<br><br>y will change by _____. |
| **Level-Log** | _____ | Take total differential:<br><br>_____<br><br>$\Rightarrow$ _____ | If x increases by _____,<br><br>y will change by _____. |
| **Log-Log (Double-Log)** | _____ | Take total differential:<br><br>_____<br><br>$\Rightarrow$ _____ | If x increases by _____,<br><br>y will change by _____. |

- **Elasticity from Linear Demand Function**

  - ○

  - ○

  - ○

  To generalize,

- **Elasticity from Non-linear Demand Function**

  _____

  (Take the _____ of the demand function):

  - ○

  - ○

  - ○

  If we do not use log-linearizing, we could still calculate elasticity in our previous method, e.g.,

  $E_{Q_x^D, P_x}$

**Part V**

**Point Elasticity vs. Arc Elasticity**

- **Point Elasticity** – Price elasticity at a particular _____ on the demand curve.

    o Problem: cannot calculate a price elasticity over _____
       of the demand curve.

- **Arc Elasticity** – Price elasticity calculated over a _____ of _____.

    E =

    where

*Example 1*

P$_x$ = \$10. When income = \$1000, Q$_x^D$ = 400; when income = \$1050, Q$_x^D$ = 450. Calculate the arc income elasticity of demand.

*Exercise 4*

Suppose the demand curve for wheat is linear. When the market price for wheat changes, it moves from Point A to Point B on the wheat demand curve. If the price elasticity of wheat demand was −0.3 at Point A and −0.4 at Point B, what is a plausible value for the arc elasticity of demand for wheat between Points A and B?

     A.  −0.25
     B.  −0.35
     C.  −0.45
     D.  −0.70