**Intermediate Microeconomics (Fall 2023)**
**Lecture 7**
**Cost**

## Part I

### Cost

- **Cost Category**
  - **Accounting Cost** – _____.
  - **Economic Cost**

    Economic Cost = _____
- **Components of Economic Cost**
  - **Total Cost (TC)** – _____
  - **Average Cost (AC) or Average Total Cost (ATC)**: AC = _____
  - **Fixed Cost (FC)** – _____ of the _____ of _____, _____ _____ the firm _____ output, _____ in the _____.
  - **Quasi-Fixed Cost** – _____ of the _____ of _____, _____ if the firm _____ a _____ of output, _____ in the _____.
    - Just for information, and ignore it when calculating TC.
  - **Average Fixed Cost (AFC)**: AFC = _____
  - **Variable Cost (VC)** – _____ on the _____ of _____: _____
  - **Average Variable Cost (AVC)**: AVC = _____
  - **Marginal Cost (MC)**: MC = _____ = _____ = _____

    or MC = _____

    ⇒ In the _____, the _____ of _____ curve is _____

- In the Short-Run
  - TC = _____
  - AC = _____
  - Many production processes have _____ and _____
- In the Long-Run

  _____ ⇒ _____

- **Sunk Cost** – Expenditure that _____ and _____: another kind of _____.

  ⇒ It should always be _____ when _____ _____.

  _____.

  E.g., pharmaceutical companies develop and test a _____ – whether the drug is a _____ or a _____, these _____ and thus are _____.

- **Cost Function**
  - **Setting up**
    - _____: Factor 1 with price _____
    - _____: Factor 2 with price _____
    - _____: production function
    - Goal: figuring out the _____ way to produce a given level of output _____
  - **Approach**

    _____

    _____

    ⇒ The solution to this problem provides the cost function of _____ – A measure of the _____ of producing _____ units of output when factor prices are _____.

**Part II**

**Cost in the Short-Run**

- **Relationship between MP and MC in the Short-Run**

  Assume capital is fixed and labor is variable (W: _____)

  ⇒ MC = _____ = _____ = _____ = _____

  ⇒ MC = _____

  ⇒ _____ curve is the _____ of _____ curve

  ⇒ When the _____ of _____, the _____ of _____, and vice versa

  ⇒ Because _____ of _____ means _____ is needed and thus, _____

  - _____

    ⇒ _____ will _____

- **The Shape of Cost Curves in the Short-Run**


- At Point A: _____
  - Before Point A

    _____
  - After Point A

    _____
- At Point B: _____
- To generalize:
  - _____
  - _____
  - _____
  - _____
  - _____
  - _____
  - _____

  ➢ _____ intersects _____ and _____ at their respective _____.

*Exercise 1*

Cost function is given by $C(Q) = 50 + 2Q + 4Q^2$, calculate the minimum average cost.

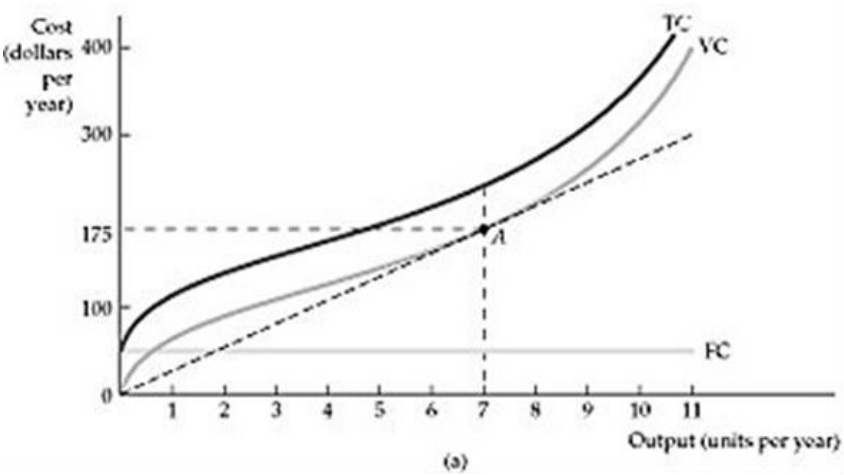
*Exercise 2*

In the short-run, the average total cost to produce 100 cookies is $0.25 per cookie, and the marginal cost is constant at $0.10 for all cookies produced. Then the total cost to produce 50 cookies is

A. $12.5
B. $20
C. $25
D. $50
E. Indeterminate.

*Exercise 3*

Refer to the figure.




When 5 units of output are produced, total cost starts to increase at a faster speed than the previous unit produced. Thus, when 2 units of output are produced

A. marginal cost is falling.
B. average total cost is falling.
C. marginal cost is less than average total cost.
D. All of the above.

*Exercise 4*

In the short-run, suppose average total cost is a straight line and marginal cost is positive and constant. Then, fixed costs must be

A. declining with output.
B. positive.
C. zero.
D. We do not have enough information to answer this question.

**Part III**

**Cost in the Long-Run**

- **Isocost Line** – _____ of _____ and _____ that _____ the _____. It measures the _____ of the _____.

  Isocost line: _____

  where

  _____ = _____ to _____

  _____ = _____ on _____

  = _____

  Rearrange algebra,

  _____

  - Vertical Intercept = _____
  - Horizontal Intercept = _____
  - Slope = _____

- **Map of Isocost Lines**

- **Optimal Production** – _____ at _____.


  - Point A:

    - At Point A,

  -

  -

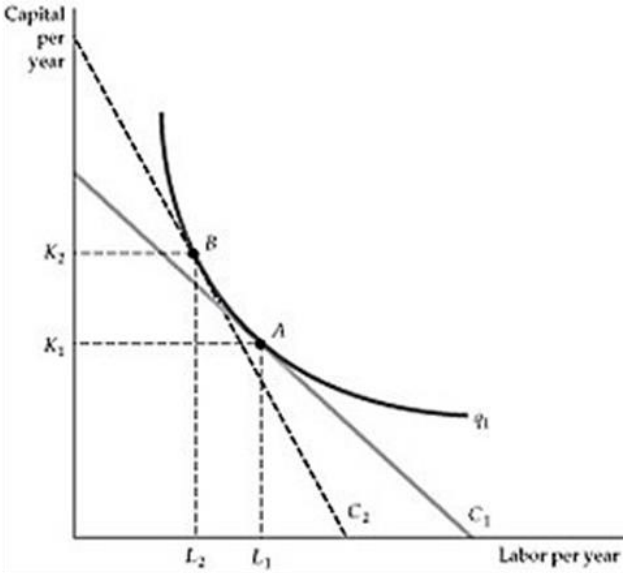
- **Conditional Factor Demand Function (also called the Derived Factor Demand)** –
  A measure of the _____ between the _____ that _____ and the _____, _____ a _____ of _____, e.g., _____ and _____.

*Exercise 5*

Production function is given by Q = F (K, L) = $K^{\frac{1}{2}}L^{\frac{1}{2}}$, w = \$10, r = \$40, and the producer would like to spend \$2,000 on this product. Put labor on the horizontal axis and capital on the vertical axis, find the optimal production for this producer.

*Exercise 6*

Refer to the figure.




When production moves from A to B, which of the following must be changed?

A. The price of one of the inputs.
B. The quantity to be produced.
C. The budget of the producer.
D. All of the above is possible.

**Part IV**

**Minimize Cost for Specific Technology**

- **Perfect Complements**

  _____

  ⇒ To produce ____ units of output, need ____ units of _____ and ____ units of _____

  ⇒ Minimal cost of production: _____

- **Perfect Substitutes**

  _____

  ⇒ Use _____ is _____

  ⇒ Minimal cost of production: _____

  _____

- **Cobb-Douglas**

**Part V**

## Applications of Cost Function

- **Setting up**
  - _____: fixed factor
  - _____: the _____ of the fixed factor to produce a given level of output _____ – the firm's _____ _____ for the fixed factor as a function of output
  - _____: the _____ cost function of the firm given the fixed factor of _____
  - _____: the _____ cost function of the firm – the _____ at the _____ of the _____

    ⇒ _____
  - _____: a random level of output y

    ⇒ _____: the _____ of the fixed factor for that level of output

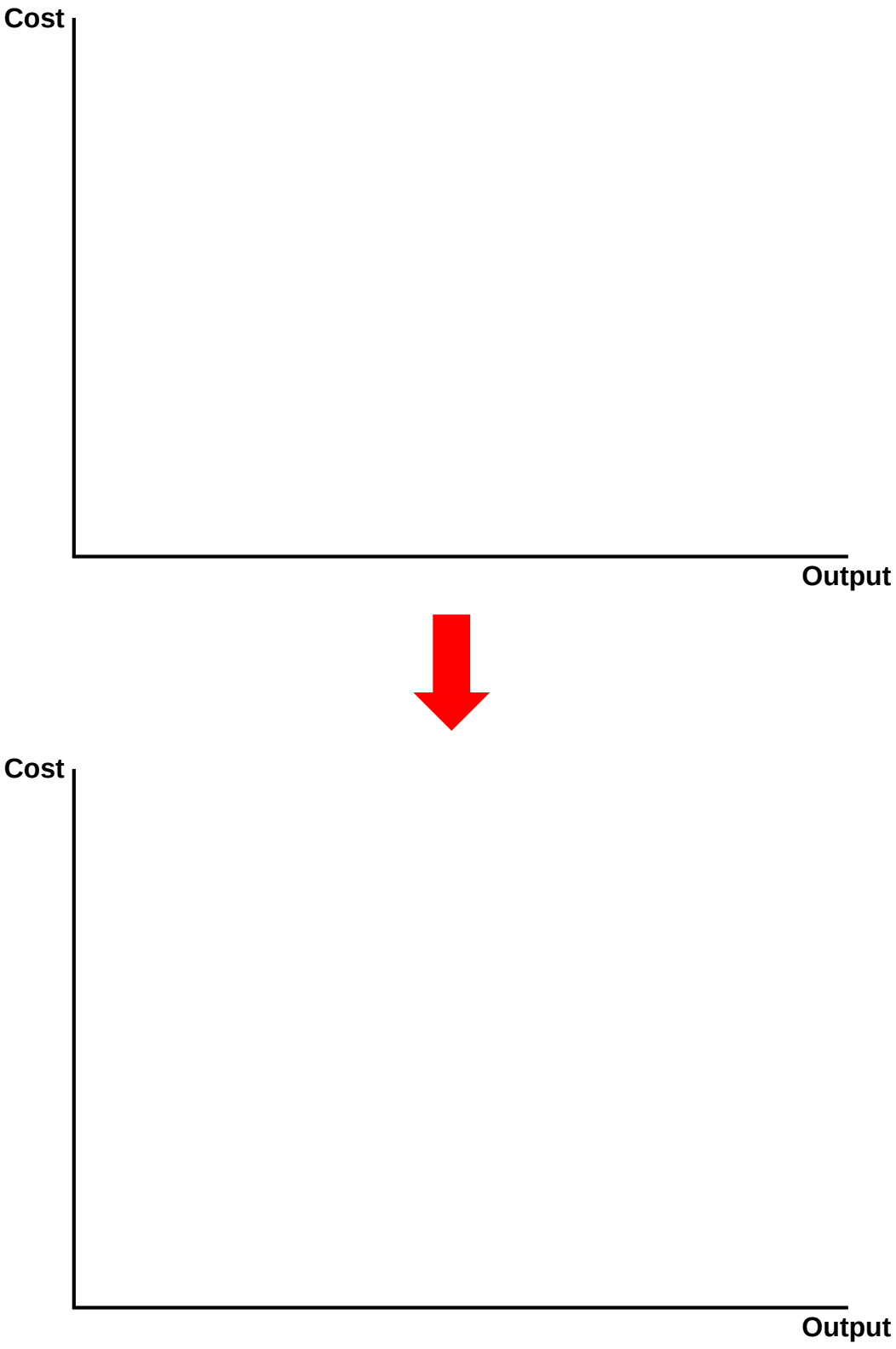
- **The Shape of the AC Curve in the Long-Run**
  - _____ for _____ of _____
  - _____ at _____ of _____, the _____

  ⇒
    - _____ for _____ of _____
    - _____ at _____ of _____, the _____

  ⇒ The _____ always _____ the _____ and they are _____ at _____

  ⇒ The _____ is the _____ of _____

- **The Figure of the AC Curve in the Long-Run**



- **The Relationship between MC and VC**

  _____

  ⇒ _____

  ⇒ The _____ the

  _____

  is the _____ of producing _____ units of output

**Part VI**

**Economies of Scale**

- **Economies of Scale** – Situation in which _____ can be _____ for _____ a _____ of _____.

  _____

- **Diseconomies of Scale** – Situation in which a _____ of _____ _____ a _____ of _____.

  _____


- **Returns to Scale vs. Economies of Scale**
  - _____ returns to scale

    ⇒ _____ AC, i.e., _____ of scale
  - _____ returns to scale

    ⇒ _____ AC, i.e., _____ of scale
  - _____ returns to scale

    ⇒ _____ AC

- **Reasons for Economies of Scale**

① _____ allows _____ to _____.

② _____ can provide _____ by _____ the _____ of _____, so that _____ can _____.

③ Firms can _____ at _____ because buying them in _____ and therefore _____.

- **Reasons for Diseconomies of Scale**

① _____ factory _____ and _____.

② _____ a _____ firm becomes _____ and _____ as the number of _____.

③ The _____ of _____ will _____ at some point because of _____.

**Part VII**

**Economies of Scope**

- **Economies of Scope** – Situation in which _____ of a _____ is _____ than the _____ that could be achieved by _____ when _____ produces a _____. In this case, it is _____ to produce _____ than _____.

  _____

  This is because

  ① _____

  ⇒ _____

  ② _____ of _____

*Example 1*

① An orange juice factory produces with orange _____ but do not need orange _____, so they discard all the orange _____.

② A pharmaceutical factory needs to extract an ingredient from orange _____ but do not need orange _____, so they discard all the orange _____.

➢ If the two factories were built _____, they could _____ their _____ by _____ the oranges, as oranges are _____ the _____ and _____ is _____.

- **Diseconomies of Scope** – Situation in which _____ of a _____ is _____ than could be achieved by _____ when _____ produces a _____.

- **Cost Complementarities** – Situation in which _____ of producing _____ as _____ of _____ is produced.

_____

*Exercise 7*

Bubba Burgers has discovered there are economies of scope available to the restaurant. Which is most likely to be a response to this discovery?

A. Bubba adds more varied inputs to burger production.
B. Bubba expands burger production, focusing on that one good.
C. Bubba contracts burger production.
D. Bubba adds grilled chicken sandwiches to the menu.
E. Bubba cuts back on the diversity of the menu.