Economics Note and Question Solve

Chapter 4:

Definition of Elasticity

Elasticity measures how much the quantity demanded or supplied changes when any factor (like price, income, or price of other goods) changes.

Definition of Price Elasticity of Demand

Price Elasticity of Demand (PED) measures how much the quantity demanded changes when the price of a product changes.

Determinants of Price Elasticity of Demand

These are the factors that influence how sensitive consumers are to price changes:

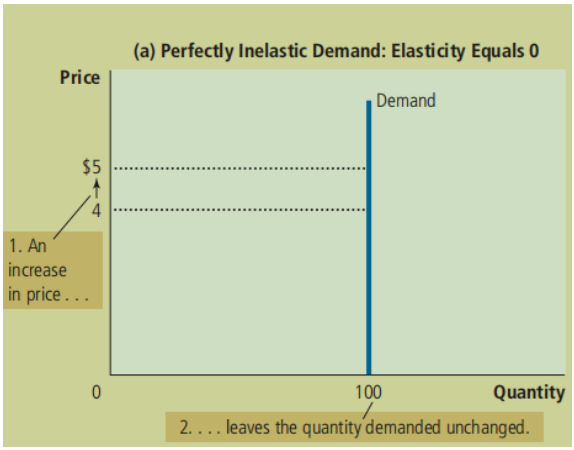
- ✓ **Availability of Close Substitutes**: Close Substitutes are elastic.
- ✓ **Nature of the good (necessity or luxury):** Necessities are inelastic, luxuries are elastic.
- ✓ **Portion of income spent:** Higher cost items are more elastic.
- ✓ **Time period:** Demand becomes more elastic over time as consumers adjust.

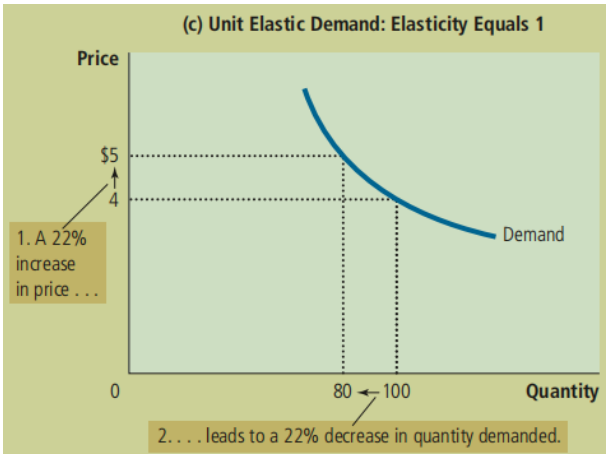
Computing the Price Elasticity of Demand

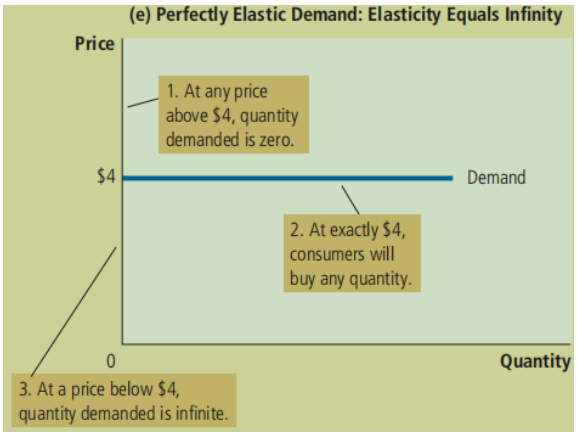
Price elasticity of demand = Percentage change in quantity demanded / Percentage change in price

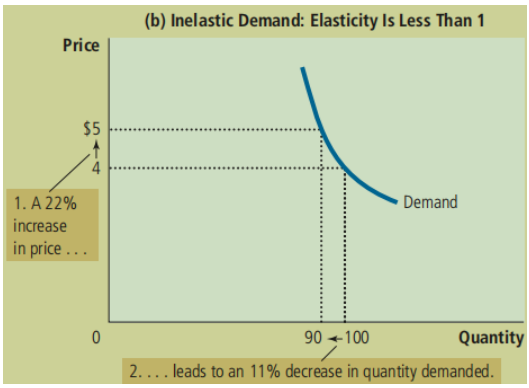
$$\text{PED} = \frac{\%\Delta Q}{\%\Delta_P}$$

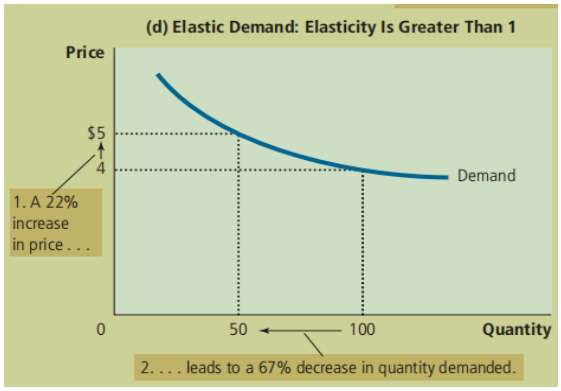
The Price Elasticity of Demand











Practice The price of a bottle of juice rises from $5 to $6. As a result, the quantity demanded falls from 200 bottles to 150 bottles. Calculate the price of elasticity of demand (PED) and state whether demand is elastic, inelastic or unitary.

PED Calculation

$$\text{PED} = \frac{\%\text{ change in quantity demanded}}{\%\text{ change in price}}$$

% change in quantity demanded:

$$\%\Delta Q = \frac{150 - 200}{200} \times 100 = -25\%$$

% change in price:

$$\%\Delta P = \frac{6 - 5}{5} \times 100 = 20\%$$

Now, PED:

$$\text{PED} = \frac{-25}{20} = -1.25$$
$$|\ \text{PED}\ | = 1.25$$

Conclusion:

Demand is elastic because | PED |> 1.

Types of Price Elasticity

Price Elasticity of Demand:

$$\text{PED} = \frac{\%\text{ change in quantity demanded}}{\%\text{ change in price}}$$

Price Elasticity of Demand measures how much the quantity demanded of a good responds to a change in its price.

- **High PED (>|1|): demand is elastic.**
- **Low PED (<|1|): demand is inelastic.**
- **PED = 1: unitary elastic.**

Income Elasticity of Demand

$$\text{PED} = \frac{\%\text{ change in quantity demanded}}{\%\text{ change in income}}$$

Shows how sensitive the quantity demanded is to changes in income.

- **Positive YED: normal goods (demand rises as income rises).**
- **Negative YED: inferior goods (demand falls as income rises).**

Cross Elasticity of Demand

$$\text{PED} = \frac{\%\text{ change in quantity demanded of good 1}}{\%\text{ change in price of good 2}}$$

Shows how the quantity demanded of one good responds to the price change of another good.

- **Positive XED: substitute goods (if price of good 2 rises, demand for good 1 rises).**
- **Negative XED: complementary goods (if price of good 2 rises, demand for good 1 falls).**

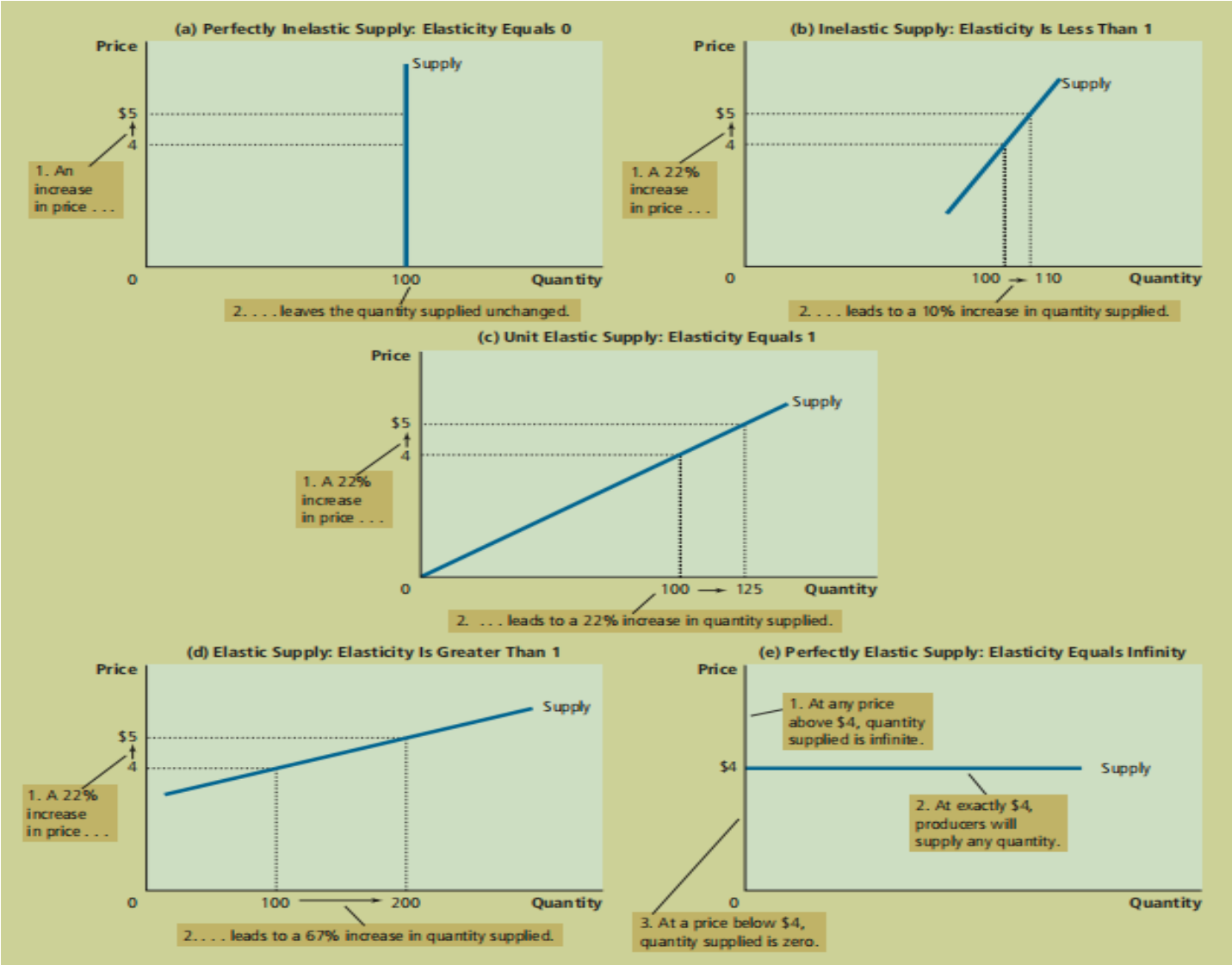
Price Elasticity of Supply

$$\text{PES} = \frac{\%\text{ change in quantity supplied}}{\%\text{ change in price}}$$

Price Elasticity of Supply measures how much the quantity supplied of a good responds to a change in its price.

- **High PES (>1): supply is elastic.**
- **Low PES (<1): supply is inelastic.**
- **PES = 1: unitary elastic.**

The Price Elasticity of Supply



Chapter 5

a) What is the price elasticity of demand? [4]

b) Explain the properties of indifference curve. [5]

c) Using the information given in the following table: [6]

Quantity of consumption (Q)	Total utility (TU)
0	20
5	15
10	10
15	5
20	0

i. Find marginal utility for each unit of consumption

ii. Draw total utility curve and marginal utility curve

iii. Explain the shape of total utility curve and marginal utility curve

a)

Definition: Price Elasticity of Demand (PED) measures the responsiveness of quantity demanded to a change in the good's own price.

$$\textbf{PED} = \frac{\%\ \textbf{change in quantity demanded}}{\%\ \textbf{change in price}}$$

Interpretation:

- ✓ $|\ \textbf{PED}\ | > 1 \rightarrow$ **demand is elastic**
- ✓ $|\ \textbf{PED}\ | < 1 \rightarrow$ **demand is inelastic**
- ✓ $|\ \textbf{PED}\ | = 1 \rightarrow$ **unitary elastic**

b) Properties of an Indifference Curve

1. **Downward sloping:** To keep utility constant, more of one good must compensate for less of the other.
2. **Convex to the origin:** Indifference curves are bowed inwards because of diminishing marginal rate of substitution
3. **Higher curves = Higher utility:** Curves farther from the origin represent higher satisfaction
4. **Never intersect:** Two indifference curves cannot cross because that would contradict the ranking of preferences.
5. **Smooth and continuous:** Curves are usually smooth (no sharp corners) assuming preferences are well-behaved and divisible.

c)

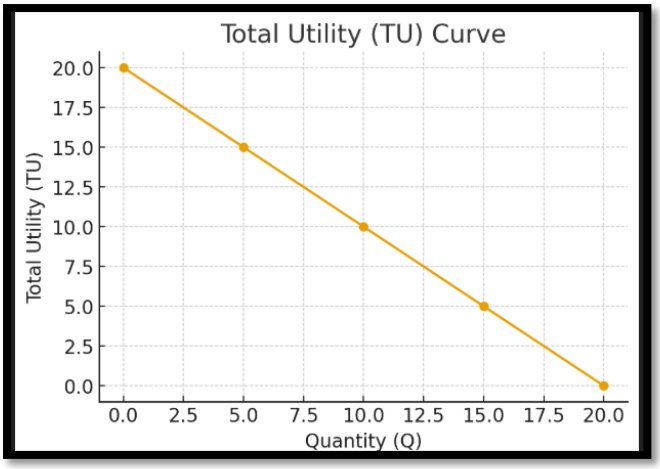
i. Marginal Utility (MU) — calculation

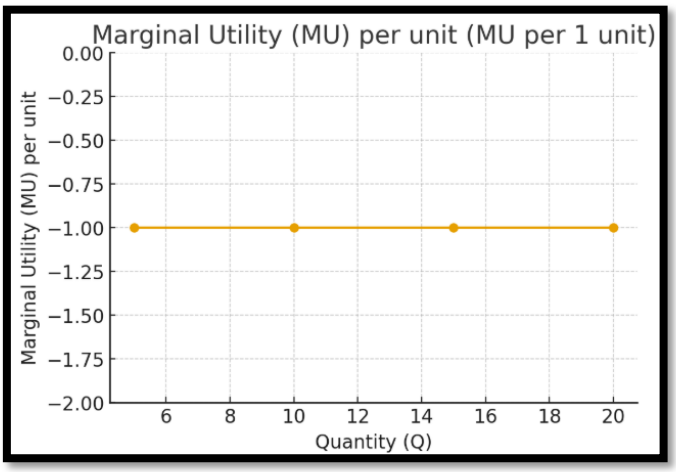
Marginal utility = change in TU when Q increases.

Interval (Q)	Change in TU (ΔTU over 5 units)	MU per 1 unit (ΔTU ÷ 5)
0 → 5	15 − 20 = **−5**	**−1.0**
5 → 10	10 − 15 = **−5**	**−1.0**
10 → 15	5 − 10 = **−5**	**−1.0**
15 → 20	0 − 5 = **−5**	**−1.0**

So the marginal utility for each additional unit is −1 (i.e., every extra unit reduces TU by 1).

ii. Total Utility Curve and Marginal Utility curves





iii. Explanation of shapes

Total Utility curve: falls as consumption increases because each additional unit reduces total satisfaction in this example (perhaps the good is harmful or over-consumed). The TU curve is linear here because TU decreases by the same amount for each equal increase in Q.

Marginal Utility curve: is a constant negative line (MU = −1) showing constant negative marginal utility — each extra unit lowers total utility by the same amount. This indicates no diminishing/increasing pattern here; MU is constant and negative.

How can interdisciplinary skills in economics and computer science improve problem-solving capabilities in technology innovation? [5]

Interdisciplinary skills in economics and computer science make technology innovation stronger and more effective. Economics helps us understand human behavior, demand, and resource use, while computer science gives us the technical tools to build digital systems. When combined, they create solutions that are both technically efficient and useful in the real world.

Economics explains how people make choices and how markets work, and computer science helps process data and design algorithms. Together, they help create technologies that match real user needs and work efficiently.

Examples show this clearly. Uber uses economic demand patterns with computer algorithms to connect riders and drivers. E-commerce platforms use economic ideas and machine learning to predict what customers will buy. Online delivery companies use pricing strategies and routing algorithms to reduce cost and time.

In conclusion, combining economics and computer science leads to smarter, more practical innovations that solve problems better and serve people more effectively.