

ANSWERS

CHAPTER 1 INTRODUCTION TO BUSINESS ECONOMICS

Activity

The most likely answer is C — eating fried rice. Eating pizza for lunch will likely prevent you from eating fried rice for lunch unless your appetite allows for it. It does not, however, prevent you from watching television at the same time, drinking orange juice, or talking with a friend while eating. Remember that opportunity cost prevents you from doing something because you decide to do something else.

Work Them Out

1. C	2. C	3. A	4. B	5. C	6. A	7. D	8. D	9. B	10. C
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Short Questions

1. Economics is the study of resources and how they relate to decisions people make.

Differences between microeconomics and macroeconomics:

- Microeconomics studies individuals, households, and firms, macroeconomics studies aggregate effects.
- Microeconomics is very broad and can cover almost any topic of economic behaviour, but macroeconomics traditionally focuses on specific areas such as employment, inflation, taxes, and governments.

2. Scarcity is the idea that there are insufficient resources to meet people's desires. Because of scarcity, resources need to be allocated across people.

Long Question

1. Opportunity cost is the concept of the next best option foregone from deciding an action. If you purchase a computer, you forgo the opportunity to invest in the bank certificate of deposit. Since the computer can be used for 3 years, we can compute what the certificate would have earned in interest over that time period:

$$\begin{aligned} & \$10,000 \times .08 \times 3 = \$2,400 \text{ (without compounding)} \\ & \text{or} \\ & \$10,000 \times (1.08)^3 - \$10,000 = \$2,597.12 \text{ (with annual compounding)} \end{aligned}$$

CHAPTER 2 MICROECONOMIC THEORY

Work Them Out

1. D	2. A	3. A	4. B	5. A	6. D	7. C	8. B	9. C	10. C
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Short Questions

1. Utility is a measure of the benefits people receive from using up resources at their disposal. Diminishing marginal utility is the concept that as more of a particular good or service is consumed, the additional utility from each additional unit of that good or service decreases.

Examples of diminishing marginal utility include:

- An individual who is hungry will receive more utility from food than an individual who has already eaten.

2. Economies of scale is a concept which states that the average cost of producing goods and services decreases as the total quantity produced increases. Economies of scale occurs because as more units are produced, fixed costs are allocated over more units, so the fixed cost per unit decreases as more units are produced.

Long Question

1. The marginal utility from each hour of sleep is as follows:

Hours Of Sleep	Total Utility	Marginal Utility
0	0	0
1	10	10
2	22	12
3	35	13
4	48	13
5	62	14
6	72	10
7	80	8

This individual receives the highest marginal utility from the fifth hour of sleep because marginal utility of 14 is the highest at this point.

CHAPTER 3 SUPPLY AND DEMAND

Work Them Out

1. B	2. D	3. D	4. B	5. D	6. B	7. B	8. C	9. D	10. A
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Short Questions

- Fixed costs are costs that remain unchanged for different levels of production. Variable costs are costs that directly relate to the level of production. Economies of scale result from fixed costs being allocated over a greater number of units produced, so unit fixed costs decrease.
- Elasticity is the measure of the percent change in quantity for a percent change in price. If elasticity equals to 0, it is perfectly inelastic, indicating that any change in price will not result in a change in quantity. Elasticity between 0 and 1 is inelastic as percent change in quantity is less sensitive than percent changes in price. If elasticity equals to 1 is unit elastic, it indicates that a percent change in price leads to an equivalent percent change in quantity. Finally, if elasticity is greater than 1, it is elastic as the percent change in quantity is more sensitive than the percent change in price.

Long Question

1.
(a) The economic nature of demand explains how:

- as a factor of production, the demand is a derived one
- the properties are to conduct profit maximising activities

The meaning of market equilibrium suggests that:

- equilibrium is the price where the quantity demanded and quantity supplied equal
- equilibrium has no tendency for changes in price and quantity
- equilibrium price is \$80 per square foot
- equilibrium quantity is 8,000 million square foot

- (b) Price elasticity of demand = $(1,000 / 8,500) \times (\$75 / \$10) = 0.88$

The value suggests that the demand for commercial rental properties is fairly inelastic.

Quantity demanded is less responsive to changes in rental price.

The factors influencing the price elasticity of demand may include the following:

- Few substitutes to commercial rental properties make it inelastic.
- Land is a necessary factor of production and its demand is inelastic.
- The proportion of rental price to total costs makes the demand inelastic.

CHAPTER 4 FACTORS OF PRODUCTION

Work Them Out

1. B	2. C	3. B	4. B	5. C	6. C	7. D	8. B	9. D	10. A
11. A	12. B	13. D	14. D	15. A	16. C	17. A	18. D	19. B	20. B

Short Questions

- The supply of labour is the amount of work provided by employees. It is determined by the relative utility employees receive from wages versus leisure. The demand for labour comes from employers. Employers pay employees for the work they do, therefore the demand for labour depends more on the relative cost (wages) of labour, as compared to the productivity of employees and the other costs of production. The more employees can produce, the more employers demand employees.
- Labour mobility is the ease with which employees can move in order to seek employment. It is usually measured by the barriers or restrictions to mobility. Barriers include the following:
 - physical barriers
 - economic factors
 - political restrictions
 - emotional factors
 - cultural factors

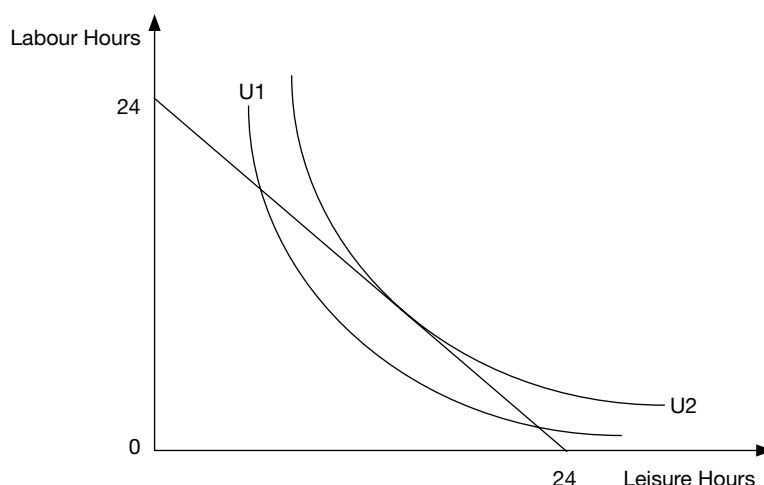
- The primary factors of production are labour, capital, and land. The following lists some examples:

Primary Factors Of Production	Examples
Labour	Time Spent, Expertise; Knowledge; Skills; Experience
Capital	Machinery; Equipment; Buildings; Vehicles
Land (or other natural resources)	Fertile ground (for growing crops); Water; Air

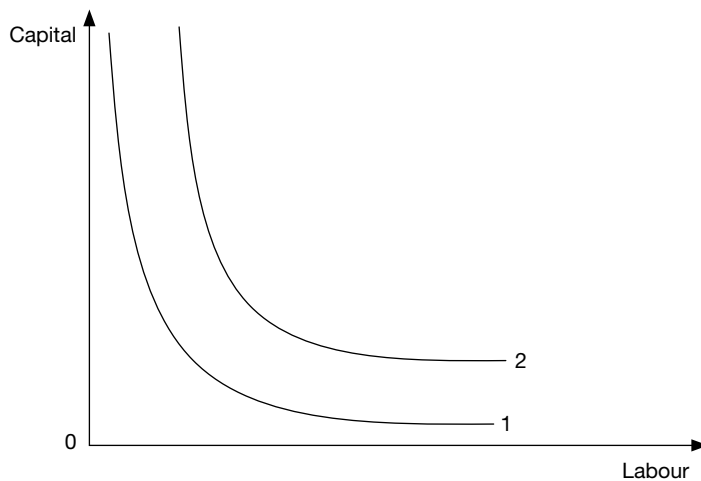
- Factors of production all represent costs that firms incur. Labour and capital are both examples of these costs. Since firms are interested in maximising profits, they seek to maximise revenues while minimising expenses. To do so, they trade off labour and capital depending on their relative productivity and cost. Examples of factors that affect the trade-off between labour and capital include:
 - cost of labour
 - cost of physical capital
 - efficiency of labour
 - efficiency of physical capital
 - flexibility of labour
 - flexibility of physical capital

Long Questions

- The table below shows the allocation of time for labour and leisure in a day.



2. The figure below shows the relationship between labour and capital with isoquants.



- The isoquants are represented by the curves labelled 1 and 2.
- Each isoquant shows different combinations that result in the same level of output
- Isoquant 1 results in an output of one unit of this good or service and Isoquant 2 results in an output of two units of this good or service.
- Both isoquants are convex (curved toward the origin) indicating that there are diminishing returns from producing with only labour or capital.
- Isoquant 2 is farther from the origin indicating that it takes more units of labour and capital to produce two units of goods relative to producing one unit of this good or service.

CHAPTER 5 EQUILIBRIUM AND MARKET STRUCTURES

Work Them Out

1. A	2. C	3. C	4. B	5. A	6. B	7. D	8. A	9. D	10. C
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Short Questions

1. The four types of market structures are monopoly, oligopoly, monopolistic competition, and perfect competition.

	Perfect competition	Monopolistic competition	Oligopoly	Monopoly
Suppliers	Large number of suppliers	Many slightly bigger suppliers	A "few" big suppliers	Single supplier
Price	Price is determined by market	Price search	No price search	Price is determined by single supplier
Barriers To entry	No barriers to entry or exist in the long run	No barriers to entry in the long run	Substantial barriers to entry	High barriers to entry

2. Barriers to entry are natural and artificial restrictions on other firms from entering a market. Examples include:

- economies of scale
- government licensing limitations
- customer brand loyalty
- high cost of investment
- limited access to resources
- patents

Long Question

1. Under a perfect competition market structure, a large number of competitors sell identical goods. In a market represented by monopolistic competition, firms do not produce identical goods, but goods that are differentiated slightly.

Perfect competition is rare because it is difficult for multiple firms to sell identical goods. Characteristics such as location or brand name differentiate firms, so even if two firms produced almost identical products, the fact that it is produced by two different firms in different locations makes them not identical.

Examples of firms operating in monopolistic competition and factors that prevent them from being perfect competition are listed in the table below.

Examples Of Monopolistic Competition Firms	Reasons Why They Are Not In Perfect competition
Water bottling companies	Even though all these companies sell water, they try to differentiate based on packaging, source of water, or taste.
Convenience stores (Circle K, Seven Eleven, etc)	The products that they sell might be identical (i.e. from the same manufacturer), but they could differentiate based on location, promotional programs, or store design.
Radio stations	Customers use radios to listen to different radio stations, so the method of delivery is the same. Different stations broadcast the same songs or new songs, but companies can differentiate on the type of music or duration of music played as compared to broadcast news and advertisements.

CHAPTER 6 MACROECONOMIC THEORY AND ECONOMIC MEASURES

Work Them Out

1. B	2. C	3. D	4. A	5. B	6. C	7. A	8. D	9. D	10. B
11. D	12. B	13. C	14. B	15. A	16. B	17. A	18. D	19. C	20. C

Short Questions

- There are three basic assumptions in neoclassical economics about human behaviour:
 - utility maximisation by individuals and profit maximisation by firms
 - rational preferences which allow for the rank ordering of goods and services
 - independent behaviour of individuals based on personal preferences
- There are many factors that influence an individual's marginal propensity to consume or save. Examples of these include:
 - Interest rate:** The higher the interest rate, the higher the incentive for individuals to save rather than consume. Higher rates of savings will lead to higher levels of consumption in the future. This is based on the assumption that individuals care about lifetime consumption — both present and future consumption — and not just current consumption.
 - Inflation rate:** A high inflation rate means that money is worth less in the future than it is in the present. Savings can result in lower consumption in the future, so individuals are likely to consume more of their income now.
 - Age (life cycle):** Young individuals are more likely to consume because they have more immediate needs and do not have the incentive to plan for retirement. Some might plan to start a family or purchase a home, for example. As individuals approach the retirement age, they might choose to save more so that they can be financially secure in retirement.
 - Social security:** Social security in some countries are government programmes aimed at providing for the living expenses of individuals after retirement. These are sometimes referred to as safety nets because they protect individuals who do not have enough savings. If there is a large or generous social security program, then people might feel less of a need to save and would consume more of their earnings.
- GDP = Consumer spending + Investment (private sector) + Government spending + Exports - Imports**

The components of the GDP equation are further explained on the next page:

- **Consumer spending:** The sum of all goods and services purchased by individual households during a given time period. Most purchases made by individuals fall under this category.
 - **Investment (private sector):** Mainly includes the business and household investments in property and equipment. Real estate purchases by families, equipment purchases by businesses, and inventory purchases are all examples of private sector investment.
 - **Government spending:** The aggregate amount spent by the government on goods and services. Examples of government spending include the salaries of government employees, funding of education institutions, conducting of research, and police and fire brigade services.
 - **Exports:** Exports increase gross domestic product because goods and services exported are assumed to be produced domestically.
 - **Imports:** Imports are produced abroad, hence it is subtracted from the calculation of gross domestic product.
4. Nominal values are the actual units of a currency. For example, if the cost for a car is \$5,000 in 1970, \$12,000 in 2000, and \$18,000 in 2010, these are all nominal values. Real values are adjusted for inflation and are typically compared against a reference year.

The benefit of nominal values is that they are actual values observed by consumers and producers in the market. No adjustment needs to be made, so one does not have to decide or know what to compare the values against. The limitation of nominal values is that it does not take into account changes in price such as inflation.

The benefit of real values is that a comparison can be made across time. Since real values are adjusted for inflation, an increase in real values means that the items are more expensive relative to other items in the economy. A limitation of real values is that it is more difficult to calculate and interpret, as different reference points will lead to different interpretations.

Long Questions

1.
 - (a) Country B has the ability to make more cars and more books, so it has an absolute advantage over Country A in producing both cars and books. The opportunity cost of Country A for each car is 200 books while the opportunity cost of Country B for each car is 20 books. Since Country A has a higher opportunity cost for producing cars, they have a comparative advantage for producing books. Country B has a comparative advantage for producing cars.
 - (b) Based on comparative advantage theory, each country should focus on the goods over which it has a comparative advantage, so Country A should focus on producing books and Country B should focus on producing cars.
 - (c) There are several steps for a mutually beneficial production.
 - After Country A and Country B decides to focus on producing the goods over which it has a comparative advantage, they can both benefit from trading with the other country.
 - Suppose Country A wants at least 2,500 cars and 500,000 books. This is the amount they could have produced on their own.
 - They can instead produce 1,000,000 books and offer 500,000 to Country B.
 - If Country B is indifferent between 20 books and a car (their opportunity cost), they would be willing to give Country A up to 25,000 cars for the 500,000 books.
 - In fact, any amount of cars given up between 2,500 and 25,000 benefits both countries.
2. A **consumer price index** estimates the cost of a bundle of goods and services known as a basket. The basket of goods used is typically based on goods and services desired by a wide range of individuals in the economy. The Hong Kong Census and Statistics Department, for example estimates the CPI for Hong Kong based on nine categories of goods and services listed below along with examples under each category:
 - Food (rice, pork, beef, saltwater fish, frozen meat, and fresh fruit)
 - Housing (rent, management fees, and maintenance costs)
 - Electricity, gas and water
 - Alcoholic drinks and tobacco products
 - Clothing and footwear (men's and women's outerclothing and underclothing)
 - Durable goods (furniture, computer and telecommunications equipment and sporting goods)
 - Miscellaneous goods (medicines and supplies, books and periodicals, cosmetics and personal care products, and jewellery)
 - Transport (motor fuel, bus fare, taxi fare, and ferry fares)
 - Miscellaneous services (school fees, medical services, and package tours)

CHAPTER 7 MACROECONOMIC FACTORS

Work Them Out

1. C	2. B	3. A	4. C	5. C	6. D	7. A	8. B	9. A	10. C
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Short Questions

- Employment** refers to individuals who work or are engaged in their own business (known as self-employed).

Unemployment refers to individuals who are actively seeking employment, but cannot find a job to their liking.

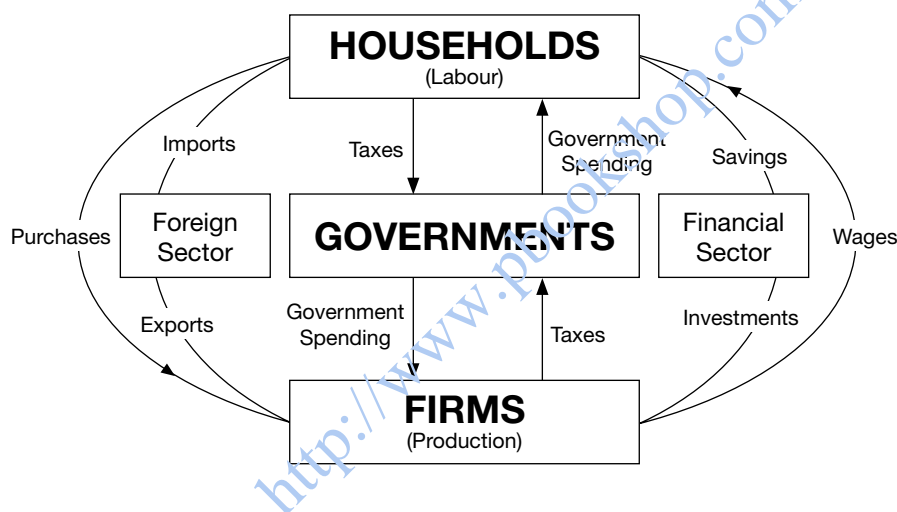
The **unemployment rate** is calculated as the number of people unemployed divided by the labour force.

The **labour force** is often defined as working age individuals who are employed or seeking employment.
- There is no consensus on what causes unemployment and how to alleviate its effects. Some factors argued to cause inflation include:

 - natural changes in business cycles
 - technological changes
 - regulatory policy
 - employer/employee attitudes

Long Question

1.



CHAPTER 8 GOVERNMENT POLICY

Work Them Out

1. C	2. B	3. B	4. A	5. A	6. B	7. D	8. B	9. D	10. C
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Short Questions

- Neoclassical economists believe that there is a limited need for government intervention as market forces will bring the economy to equilibrium. Keynesian economics view the government as a major factor that balances short-term distortions in the market. Distortions are known as market failures. In practice, most governments fit somewhere between the two extremes of no intervention and total control.
- Fiscal policy can be considered the direct option available to governments to influence economic outcomes. Monetary policy is the indirect influence of governments on the economy.

Examples of fiscal policy actions include increasing or decreasing taxation, changing the amount of goods and services provided, increasing spending on infrastructure, or direct cash payments to citizens.

Examples of monetary policy include increasing or decreasing interest rates, changing reserve requirements of banks, or printing more money.

Long Question

1. The steps required to correct market failure will depend on the type of market failure present.
 - **Correcting imperfect competition:** An example of government intervention that corrects imperfect competition is regulation that is aimed at promoting economic competition. In many parts of the world such as the United States and the European Union, there are rules imposed against unfair trade practices. Companies are not prevented from being natural monopolies, but they cannot engage in acts that are deemed to be unfair. For example, companies cannot collude to inflate prices or use their market power to prevent customers from using the goods and services produced by their competitors.
 - **Correcting externalities:** Recall that externalities can be either positive or negative. For goods where positive externalities exist, there might not be enough benefit to any one party to warrant the production of that good or service. However, the overall benefits produced can justify its production. As a result, goods and services with positive externalities are usually provided by the government. Most public roads and highways are provided by governments because of the positive externalities produced. Where negative externalities exist, firms do not bear the full cost of their decisions. As a result, the government may choose to impose taxes, fees, and sanctions to prevent certain behaviour. Many governments mete out fees or penalties to companies that pollute the air or water around their factories.
 - **Correcting natural market failures:** The government may also impose property rights to encourage certain activities that would be difficult to protect otherwise. For example, authors possess the copyrights to their work and can sell them exclusively. Without such protection, authors would be less likely to write books because others can easily copy their books, articles, music, or other works.

CHAPTER 9 INTERNATIONAL TRADE

Work Them Out

1. B	2. D	3. C	4. B	5. D	6. A	7. C	8. A	9. B	10. D
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Short Questions

1. The balance of payments is a record of the international economic transactions that a country engages in over a period of time, typically a year. The balance of payments includes the current account, the capital account, and any balancing items.
 - The **current account** refers to earnings of a country from international trade and is measured as the total amount of net exports (exports less imports), net investment income (foreign investment earnings less foreign investment costs), and cash transfers.
 - The **capital account**, also known as the **financial account**, refers to the change in ownership of foreign financial assets. The capital account is measured as the amount of foreign direct investment (from foreign investors to the domestic market) plus net portfolio investment and other investments plus the reserve account.
2. Exchange rates can be either floating or pegged.
 - A floating exchange rate means that market forces determine the relative value of the currencies based on supply and demand. A more desirable currency will be more valuable, increasing its exchange rate and a less desirable currency will have a lower exchange rate. A factor that determines the demand for a currency could relate to how risky a currency or government is perceived to be (high inflation, for example).
 - A pegged or fixed exchange rate is a target exchange rate set by a government. A peg is achieved through the monetary policy of the government or central bank which must purchase or sell either the local currency or currency against which the local currency is pegged.

Long Question

Protectionism is government policy that favours certain segments of the domestic economy, typically producers, at the expense of foreign producers. Protectionist policies include tariffs and quotas which are explained below:

- **Tariffs** are taxes imposed on imported goods. Since the tariff increases the price of these goods, consumers are discouraged from buying imported goods which then gives preference to domestically produced goods.
- A **quota** is a maximum number that companies are permitted to import. Quotas restrict the amount of goods entering the market from foreign countries, again protecting domestic producers.
- An extreme case of a trade barrier is known as an **embargo** where a country restricts almost all trade with another country.

CHAPTER 10 FINANCIAL MATHEMATICS, TIME VALUE OF MONEY, AND RATES OF RETURN

Activity

To compute the IRR, we must first input the cash flows from a project and the duration of these cash flows. In our example, the initial investment is \$1,000, so this is a cash flow of (\$1,000) or an outflow of \$1,000. This is a one-time payment. Thereafter, we have a positive \$300 cash flow for four years.

- 1) On a financial calculator, locate the cash flow button also denoted as "CF".
- 2) The first screen shows CF0 which is the cash flow from time period 0. Enter -1000.
- 3) Find an arrow button and scroll down to the next input screen which shows C01 or CF01, meaning the 1st series of cash flows.
- 4) Enter 300.
- 5) Scroll down to the next page which shows F01 which means the frequency of C01.
- 6) Enter 4 (the financial calculator will know this is 4 equal installments).
- 7) Scroll down again and make sure the remaining cash flows are 0.
- 8) After the cash flows have been entered, press IRR button followed by compute (or CPT).

The solution to this example is approximately 7.71 per cent.

Work Them Out

1. D	2. C	3. B	4. B	5. D	6. C	7. D	8. A	9. C	10. B
11. B	12. D	13. B	14. B	15. C	16. A	17. A	18. D	19. A	20. B

Short Questions

1. Simple interest earns a stated amount of interest over the period of the loan. Compound interest means that interest is also earned on the amount previously earned as interest.
2. The present value of an annuity factor table provides a series of numbers known as factors. When these factors are multiplied by the value of the future amount paid or received, the resulting number is the present value of that future payment. The tables are organised with the number of time periods listed by rows (each row represents a different time period) and discount rates listed by columns (each column represents a different discount rate).

3.

Project Number	Initial Investment	Discount Rate	Year 1 Return	Year 2 Return	Year 3 Return	Net Present Value
1	\$1,000	10%	\$1,500	\$2,000		A
2	\$5,000	5%	\$3,000	\$1,500	\$1,500	B
3	\$3,000	15%	\$1,500	\$1,500	\$1,500	C

- A $(\$1,000) + \$1,363.63 + \$1,652.89 = \$2,016.52$
 B $(\$5,000) + \$2,857.14 + \$1,360.54 + \$1,295.76 = \$513.44$
 C $(\$3,000) + \$1,304.35 + \$1,134.22 + \$986.27 = \$424.84$

Long Question

1.

Investment Type	Present Value For One-time Payment And Payment For Annuity	Number Of Periods	Discount Rate	Future Value
One-Time Payment	\$250,000	A = 6	7%	\$375,175
One-Time Payment	B = \$20,000	10	7%	\$39,344
Annuity	\$10,000	17	C = 3%	\$217,616
Annuity	D = \$10,439.31	13	10%	\$256,000

Answer A: Future Value / Present Value = 1.5007.

This is the future value factor of a one-time payment with an 7 per cent discount rate. Look in Appendix 2 under the column with 7 per cent discount rate. 1.5007 corresponds with $n = 6$. The number of periods for answer A = 6.

Answers

Answer B: Looking at $n = 10$ and $r = 7\%$, the present value factor in Appendix 1 is equal to 0.5083.

Multiply \$39,344 by 0.5083 to get an answer of 19,998.55. Since the present value factors are rounded, a likely answer to the question could also be \$20,000.

Answer C: The Future Value / Present Value = 21.7616.

This is the future value factor of an annuity over 17 periods. Look at Appendix 4 under the row where $n = 17$. The corresponding discount rate in row $n = 17$ where the factor is equal to 21.7616 is $r = 3$. The discount rate is 3 per cent.

Answer D: In Appendix 3, the present value factor of an annuity paid over 13 years with a discount rate of 10 per cent is 24.5227.

Divide \$256,000 by 24.5227 to get payments = \$10,439.31

CHAPTER 11 DATA COLLECTION AND PRESENTATION

Work Them Out

1. C	2. C	3. A	4. B	5. C	6. D	7. B	8. A	9. C	10. B
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Short Questions

- Probability sampling is when every unit in the population has positive probability of being selected in the sample. Non-probability sampling occurs when some units in the population has a zero chance or unknown chance of being included in the sample.

Examples of probability and non-probability sampling methods are outlined in the table below.

Probability Sampling Methods	Non-probability Sampling Methods
Simple random sampling	Quota sampling
Systematic sampling	Convenience sampling
Stratified sampling	Judgment sampling
Cluster sampling	

- The primary characteristics of bar charts, histograms, and frequency polygons are as follows:
 - Bar charts show numerical data that is compared by the heights of different bars. The bars could represent data for different targets or data for the same target over different periods of time.
 - Histograms look similar to bar charts, but each bar typically represents a range of data. Histograms are useful for continuous data when including a separate bar for each data point is difficult. Histograms group similar data into the same bar to show the approximate frequency of different data.
 - Frequency polygons present the same data as histograms, but the midpoints of the top of each bar are connected.
 - The benefit of both histograms and frequency polygons is that they show the distribution of the sample data.

Long Question

- Stem and leaf display for sample student heights in centimeters.

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14 | 5 6 8
15 | 0 0 3 7
16 | 2 2 6 8
17 | 0 0 4 5
18 |
19 | 1
  
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Key: 14 | 5 = 145 cm

Leaf unit = 1 cm

Stem unit = 10 cm

CHAPTER 12 STATISTICAL ANALYSIS

Work Them Out

1. A	2. C	3. B	4. A	5. C	6. D	7. C	8. B	9. D	10. A
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Short Questions

- Since there are six sides and each side is equally likely to occur, the probability of any number showing up on any die roll is $1/6$. If there are a small number of rolls, this could deviate from the expected probability because the rolls are discrete and each observation can only be one of the numbers (cannot be 16.67 per cent of a number). As a result, to test whether the die is fair, one would want to roll the die many times such that the law of large number can take effect. The law of large number states that as the number of observations increase, the observed probability approaches the expected probability.
- The following lists the steps of calculating the variance of a sample:
 - Estimate the mean of the population.
 - Calculate the distance each observation is from the mean.
 - Square the distance from the mean for each observation.
 - Sum the squared values obtained in step 3.
 - Divide the number from step 4 by the number of observations.

Long Question

1.

$$(a) \text{ Mean} = \sum \frac{x_i}{n} = \frac{4.5 + 4.7 + 2.3 + 2.9 + 2.7 + 2.9 + 3.6 + 2.1 + 1.4 + 5.2}{10} = 3.23.$$

The average rate of return is 3.23.

Median = 2.9

Arrange in ascending order and the median is in the middle of 5th and 6th observation.

Position	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
	1.4	2.1	2.3	2.7	2.9	2.9	3.6	4.5	4.7	5.2

Half of the rate of return is less than 2.9 per cent and the other half is more than 2.9 per cent.

Mode = 2.9.

The most frequent rate of return is 2.9.

- (b) The three characteristics of the mean are as follows:

- representative because the whole set of data are used in calculation
- influenced by extreme values
- a set of data has a unique mean

(Other valid explanations are acceptable.)

The three characteristics of the mode are as follows:

- not influenced by extreme values
- easy to calculate
- a chance for more than one mode for each data set

(Other valid explanations are acceptable.)

The three characteristics of the median are as follows:

- not influenced by extreme values
- every set of data has a unique median
- can be determined for grouped data

(Other valid explanations are acceptable.)

2.

- (a) The standard deviation for locality X is
 $= \sqrt{514,400}$
 $= \$717$

The standard deviation for locality Y is
 $= \sqrt{464,400}$
 $= \$681$

- (b) The co-efficient of variation for locality X is
 $= (\$717 / \$4,860) \times 100\%$
 $= 14.75 \%$

The co-efficient of variation for locality Y is
 $= (\$681 / \$4,800) \times 100\%$
 $= 14.18\%$

Co-efficient of variation presents standard deviation as a percentage of the mean. It provides a measure to compare variability between data sets.

CHAPTER 13 INDICES

Work Them Out

1. B	2. C	3. C	4. D	5. C	6. B	7. C	8. A	9. D	10. C
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Short Questions

1. A consumer price index estimates the total price for a specific quantity of certain consumer goods and services, known as a "basket". To aid in comparison across time, a reference year, often called the base year is typically selected and the CPI for that time is set at 100. The base year price can also be set at one. It makes no difference whether a price index is normalised to 100 or 1, the implications are the same. The CPI, when normalised to 100 is calculated with the following general formula:

$$\text{CPI} = 100 \times (\text{adjusted cost} / \text{base period or location cost})$$

A producer price index is similar to a consumer price index, except that the prices of interest is the price producers receive (wholesale price) and not the prices consumers eventually pay (retail price).

2. The two most common methods for computing a price index are known as a Laspeyres Index and a Paasche Index. Both the Laspeyres and Paasche indices are a measure of prices and quantities. The primary difference is that the Laspeyres compares the current price of a basket of goods at **base** quantity while the Paasche Index compares the current price of a basket of goods at the **current** quantity.

The limitation of both computations of the price index is that the estimation of inflation is based on a specific amount of quantity (either base or current) and does not account for the fact that changes in price affects the quantity amount. As a result, the Laspeyres index tends to overstate inflation while the Paasche index tends to understate inflation.

Long Question

1. The Laspeyres and Paasche price indices are as follows:

Year	Price Of A	Quantity Of A	Price Of B	Quantity Of B	Laspeyres Price Index	Paasche Price Index
2000	12	105	8	50	1	1
2001	12	105	10	55	1.060	1.065
2002	14	104	12	57	1.247	1.256
2003	16	103	16	65	1.494	1.531
2004	17	105	20	60	1.678	1.716

CHAPTER 14 TIME SERIES ANALYSIS

Work Them Out

1. C	2. B	3. D	4. A	5. C	6. B	7. A	8. B	9. A	10. C
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Short Questions

1. A time series is a set of data which includes a unique time characteristic. The time period can be any reasonable time period including daily, monthly, quarterly, or annually. Ideally, a time series should have equal time increments and only one observation per unique time period.
2. Linear growth means that a set of data is growing at a steady rate across time. An exponential growth rate means that the rate of growth increases as time passes. In other words, later periods of growth occurs at a faster rate than earlier periods of growth.

Examples of linear growth might include the following:

- the amount of water flowing down a river
- the money earned from working (more hours worked typically increases income linearly)
- the growth in height of a human child (under the age of 15)

Examples of exponential growth include:

- the increase in the human population worldwide
- the amount of money earned in an investment with a compounding interest rate

Long Question

1. The four components of time series data discussed include:
 - The **trend variation** is the portion of time series data that exhibits a directional change over the long term.
 - The **seasonal variation** of a trend is where data exhibits consistent patterns that follow the four seasons.
 - The **cyclical variation** of time series data is the repeated patterns of increasing and decreasing trends over non-regular intervals.
 - The **irregular variation** describes factors that influence trends in random, unpredictable ways.