

FYBCom Semester I
Open Elective: Financial Mathematics
Question Bank

Module 1: Interest and Annuity

* Simple Interest and Compound Interest, compounded more than once a year.

1. State the formula of the following: (a) Simple Interest (b) Amount Due (c) Compound Interest
[(a) $I = P \times n \times \frac{r}{100}$, (b) $A = P + I$, (c) $A = P \left(1 + \frac{r}{100}\right)^n$ & $I = A - P$]
2. Find simple interest on Rs. 1000 for 3 years at 5% per annum. Also find the amount after 3 years.
[Rs. 1150]
3. At what simple interest rate will Rs. 1200 earn Rs. 192 in 2 years?
[08% per annum]
4. What sum of money will amount to Rs. 8432 in 4 years at 6% p.a. simple interest?
[Rs. 6800]
5. In how many years will Rs. 6500 amount to Rs. 7865 at 7% p.a. simple interest?
[03 years]
6. In how many years will the sum of money be doubled at 25% p.a. simple interest?
[04 years]
7. In how much time will Rs. 5000 at 3% p.a. produce the same income as Rs. 10000 in 2 years at 3% p.a. simple interest?
[04 years]
8. Find the compound interest on Rs. 10000 for 3 years at 5% p.a. Also find the amount after 3 years.
[Rs. 1576.25 & Rs. 11576.25]
9. Calculate the amount payable for an investment of Rs. 20000 for 8 years at 8% compound interest.
[Rs. 37018.60]
10. What sum of money will amount to Rs. 73502.58 in 3 years at 7% p.a. compound interest.
[Rs. 60000]
11. Find the present value at a 5% rate of interest of Rs. 7408.80 payable 3 years from now.
[Rs. 6400]
12. In how many years would Rs. 430000 become Rs. 497778.75 at 5% p.a. compound interest.
[03 years]
13. At what rate of compound interest would an amount double itself in 3 years? [Hint: $2^{\frac{1}{3}} = 1.2611$].
[26.11%]

* Annuity, Immediate and Due, Present Value, Future Value of an Annuity

1. State the formula of the following: (a) Accumulated Value (b) Present Value of Immediate Annuity
[(a) $A = \frac{C}{i} [(1 + i)^n - 1]$ and (b) $P = \frac{C}{i} [1 - (1 + i)^{-n}]$]
2. Find the future value of Rs. 2000000 after 3 years if the compound interest rate is 8 % p.a.
[Rs. 2519424]
3. Find the accumulated value after 3 years of an immediate annuity of Rs. 10000 with compound interest at 7% p.a.
[Rs. 32147]
4. A person deposits Rs. 15000 at the end of each year for 3 years. What is the accumulated amount at the end of 3 years taking interest compounded at 12 % p.a.?
[Rs. 50616]

5. Miss Rukmini Shetty plans to save for her daughter's higher studies. She wants to accumulate an amount of Rs. 100000 at the end of 4 years. How much should she invest at the end of each year from now, if she gets interest compounded at 7 % p.a.
[Rs. 22522.81]
6. Mr Amol Kirkire invested Rs. 6000 at the end of each year at 10% compound interest for some years and received Rs. 19860 as the accumulated amount. For how many years did he invest?
[03 years]

Module 2: Measures of Central Tendency and Dispersion

* Arithmetic Mean, Weighted Mean, Combined Mean, Mode, Median, Quartile

1. State Merits and Demerits of Arithmetic Mean.
2. The pocket money allowance of 50 students is given below. Find the arithmetic mean of the allowance.

Allowance (In Rs.)	800	900	1000	1100	1200	1300	1400
Number of Students	05	07	09	11	09	05	04

[Rs. 1086]

3. The following data gives the number of defective articles by workers in a factory in a month. Find the arithmetic mean.

Number of Defective Articles	20-30	30-40	40-50	50-60	60-70
Number of Workers	05	08	10	12	05

[46]

4. Calculate Arithmetic Mean for the following frequency table.

Class Interval	20-30	30-40	40-50	50-60	60-70
Frequency	08	26	30	20	16

[46]

5. Arithmetic Mean of heights of 100 boys is 150 cm, and that of 50 girls is 144 cm. Find the Combined Arithmetic Mean of 150 items.
[148 cm]
6. Arithmetic Mean of daily wages of men is Rs. 120, and that of women is Rs. 100. If the arithmetic mean of daily wages of men and women taken together is Rs. 112, then find the ratio of the number of men and women.
[3:2]
7. If the arithmetic mean of the weights of 100 students in class is 52 kg. Out of 100 students there are 60 boys, and the arithmetic mean of their weight is 54 kg. Find the Arithmetic Mean of weights of 40 girls.
[40 kg]
8. Define 'Median' and find the median of the IQs of 8 children, which are given as 100, 123, 115, 109, 98, 105, 113, 120.
[111]

9. Calculate median height of a group of children.

Height in cm	110	111	112	113	114	115	116	117
Number of Children	07	09	12	20	25	15	07	04

[114 cm]

10. Find the median for the following frequency distribution.

Percentage Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
No. of Students	04	09	19	20	18	06	02	01	01	0

[34%]

11. Define the term 'Mode' and find it for the raw data 5, 6, 3, 2, 9, 12, 15, 12, 7, 12.

[12]

12. State Merits and Demerits of Mode.

13. Find the mode for the following data:

Class Intervals	0-25	25-50	50-75	75-100
Frequency	500	700	800	400

[55]

14. A survey was conducted in a housing complex to find out the number of persons in various groups who are using the ATM cards of banks. The results of the survey are as shown below. Find the mode of the above distribution.

Age Group	Below 20	Below 40	Below 60	Below 80
No. of Persons Using ATM Cards	10	25	50	70

[53.333]

* Range, Quartile Deviation and Mean Deviation about an Arithmetic Mean.

1. Define the terms 'Range' and 'Coefficient of Range'.
2. The price of gold for the entire week is given below. Calculate the range and its coefficient.

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Price	5420	5750	6000	5800	5400	5670

[600, 0.053]

3. Calculate the range and its coefficient for the following:

Marks	10-25	25-50	50-75	75-100
No. of Students	13	25	32	10

[90, 0.82]

4. Define "Interquartile Range", "Quartile Deviation" and "Coefficient of Quartile Deviation".

5. Find out the value of quartile deviation and coefficient of quartile deviation for the following:

Roll No	1	2	3	4	5	6	7
Marks	20	25	40	12	31	15	60

[12.5, 0.455]

6. Compute the quartile deviation and its coefficient for the following frequency distribution:

Wages per day (in Rs)	10	20	30	40	50	60
No. of Employees	04	07	15	08	07	02

[10, 0.33]

7. Define the term “Mean Deviation about an Arithmetic Mean” for both raw data and frequency distribution.
8. Calculate the mean deviation from the mean of the following data, which represent the heights (in cm) of 7 soldiers: 168, 164, 172, 169, 178, 173, 173.

[3.43 cm]

9. Calculate the mean deviation from the mean of the following frequency distribution.

x	-2	-1	0	1	2	3	4
f	02	03	03	04	03	03	02

[1.5]

10. State merits and demerits of Range, Quartile Deviation and Mean Deviation.