

Bangladesh University of Business and Technology (BUBT)

Program: B.Sc. CSE

Intake: 52

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Course No: MAT-231

Course Title: Complex Variable and Statistics

Assignment-2 [Submission Date: June 01, 2025]

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Complex Integration:

1. Evaluate $\oint_F \frac{e^{pz}}{(z^2+1)^2} dz$, where F is a close curve $|z - 1 + i| = 5$.
2. By using the Cauchy's integral, **Evaluate** $\oint_D \frac{\sin \pi z^3 + \cos \pi z^3}{(z^2-3z+2)(z-2+3i)^2} dz$, where D is a circle $|z - i| = 4$.
3. Evaluate $\oint_C \frac{z^2 e^{iz}}{z^2 + \pi^2} dz$, where C is a circle $|z| = 4$.
4. Evaluate $\oint_C \frac{e^{-iz}}{z^2 - iz + 3z - 3i} dz$, where $C = \{z: z = 1 + 2e^{i\theta}, 0 \leq \theta \leq 2\pi\}$.
5. Show that $\oint_C \frac{e^{pz}}{z^2+1} dz = 2\pi i \sin p$, where C is a simple closed curve containing the points $z = \pm i$ and p is any positive number.
6. Evaluate the integral $\oint_C \frac{z^2 \sin 2z}{(z - \frac{\pi i}{2})^2} dz$, where C is the circle $|z - 2| = 7$.

Statistical Data Representation:

7. Weaver (1990) examined a galvanized coating process for large pipes. Standards call for an average **coating weight** of 200 lbs per pipe. These data are the coating weights for a random sample of 30 pipes:

216	202	208	208	212	202	193	208	206	206
206	213	204	204	204	218	204	198	207	218
204	212	212	205	203	196	216	200	215	202

8. **Classify** the frequency distribution taking a suitable class interval from the following marks of the 50 students:

67	34	36	48	49	31	61	34	43	45
38	32	27	61	29	47	36	50	46	30
46	32	30	33	45	49	48	41	53	36
37	35	47	62	46	50	28	35	35	38
36	46	43	34	62	69	50	28	44	43

9. Represent the following data by a histogram:

Size Class	Frequency	Size Class	Frequency
20-30	5	70-80	10
30-40	11	80-90	8
40-50	19	90-100	6
50-60	21	100-110	3
60-70	16	110-120	1

10. Suppose we have the following data:

Item	Expenditure (\$)
Food	600
Clothing	100
House rent	400
Fuel and lighting	100
Miscellaneous	300

- (i) Represent the data as a pie chart.
(ii) Represent the data as a bar diagram.

Central Tendency and Measure of dispersion

11. Consider the following frequency distribution. Calculate the mean weight of students from the following data:

Weight (in kg)	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71-75
Number of Students	5	7	10	15	11	9	6	5	2

12. Calculate the median marks of students from the following distribution:

Marks	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70	70 – 80
Number of Students	7	10	10	20	20	15	8

13. The given distribution shows the number of runs scored by some top batsmen of the world in one-day international cricket matches:

Run Scored	3000-4000	4000-5000	5000-6000	6000-7000	7000-8000	8000-9000	9000-10000	10000-11000
Number of Batsman	4	18	9	7	6	3	1	1

Find the mode of the above distribution.

14. The following table shows the distribution of monthly sales of microprocessor of 200 Bangladeshi companies at January 2025, **estimate** mean and mode of the income.

Sells of processor	100-150	150-200	200-250	250-300	300-350	350-400	400-450	450-500
No. of Company	10	25	35	50	40	20	15	5

15. The following data gives the profit of 70 Information Technology Companies for the year 2024, **calculate** co-efficient of variation.

Profit (Lakh Taka)	20-30	30-40	40-50	50-60	60-70	70-80
Number of Companies	7	13	20	15	10	5

16. Calculate the mean, variance and standard deviation for the following data:

Class Interval	0-10	10-20	20-30	30-40	40-50	50-60
Frequency	27	10	7	5	4	2

17. The diameters of circles (in mm) drawn in a design are given below:

Diameters	33 – 36	37 – 40	41 – 44	45 – 48	49 – 52
No.of circles	15	17	21	22	25

Determine the standard deviation and coefficient of variance from the following data.

18. The temperature of two cities A and B in a winter season are given below:

Temperature of city A (in degree Celsius)	18	20	22	24	26
Temperature of city B (in degree Celsius)	11	14	15	17	18

19. A purchasing agent obtained samples of 60 watt bulbs from two companies. He had the samples tested in his own laboratory for length of life with the following result:

Length of life (in hours)	Company A	Company B
1700-1900	10	3
1900-2100	16	40
2100-2300	20	12
2300-2500	8	3
2500-2700	6	2

- a) Which company's bulbs do you think are better?
b) If prices of both types are the same, which company's bulbs would you buy?