Holidays Assignment (2024)

Class – XI

Mathematics

(Statistics)

Formulae of the chapter:

(<u>For ungrouped Data</u>)

1. Mean Deviation about mean = $\frac{\sum|x_i - \bar{x}|}{n}$, where $\bar{x}$ is the mean
2. Mean Deviation about median = $\frac{\sum|x_i - M|}{n}$, where M is the mean
3. Variance(σ^2) = $\frac{\sum(x_i - \bar{x})^2}{n}$
4. Standard Deviation (σ) = $\sqrt{Var(X)}$

(<u>For grouped Data</u>: Discrete and Continuous Frequency Distribution)

5. Mean Deviation about mean = $\frac{\sum f_i|x_i - \bar{x}|}{\sum f_i}$, where $\bar{x}$ is the mean
6. Mean Deviation about median = $\frac{\sum f_i|x_i - M|}{\sum f_i}$, where M is the mean
7. Variance(σ^2) = $\frac{\sum f_i(x_i - \bar{x})^2}{\sum f_i}$
8. Standard Deviation (σ) = $\sqrt{Var(X)}$
9. Standard Deviation (σ) = $\frac{1}{n}\sqrt{n\sum f_i {x_i}^2 - (f_i x_i)^2}$, where $n = \sum f_i$

   Or S. D (by **short cut method**) = $\frac{h}{n}\sqrt{n\sum f_i {y_i}^2 - (f_i y_i)^2}$, where $y_i = \frac{x_i - a}{h}$, a is assumed mean, h is class size

Using the above formulae, solve the following questions (on A4 size sheets):

1. Find the mean deviation about the mean as well as about the median for the following series:
   12, 3, 18, 17, 4, 9, 17, 19, 20, 15, 8, 17, 2, 3, 16, 11, 3, 1, 0, 5
2. Find the mean deviation about the mean for the following data:

x_i	2	5	6	8	10	12
f_i	2	8	10	7	8	5

3. Find the mean deviation about the median for the following data:

x_i	3	6	9	12	13	15	21	22
f_i	3	4	5	2	4	5	4	3

4. Find the mean deviation about the mean for the following data:

Class Intervals	4 - 8	8 - 12	12 - 16	16 - 20
Frequency	3	6	4	7

5. Find the mean deviation about the median for the following data:

Marks	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60
Number of girls	8	10	10	16	4	2

6. Find the varience ad standard deviation for the following data:
   57, 64, 43, 67, 49, 59, 44, 47, 61, 59

7. Calculate the mean and standard deviation for the following data:

Size of the item	6	7	8	9	10	11	12
Frequency	3	6	9	13	8	5	4

8. Calculate the mean and standard deviation for the following data:

Class Intervals	25-35	35 - 45	45 - 55	55 - 65	65 - 75
Frequency	21	20	16	25	18

9. Two plants A and B of a factory show the following results about the number of workers and the wages paid to them:

	A	B
No. of workers	5000	6000
Average monthly wages(in Rs.)	2500	2500
Varience of distribution of wages	81	100

   Which plant of the factory, A or B, is more consistent in individual wages?

1) If $\sin\theta = \cos\theta$, find the value of 'θ'.

2) If $\sin A = \frac{3}{5}$, calculate cos A

3) Evaluate: $\cos 48^0 \cos 42^0 - \sin 48^0 \sin 42^0$

4) If A, B and C are the interior angles of a triangle ABC, then show that $\tan\left(\frac{B+C}{2}\right) = \cot\left(\frac{A}{2}\right)$.

5) Prove that $\sqrt{\frac{1+\cos A}{1-\cos A}} = \operatorname{cosec} A + \cot A$.

6) If $\operatorname{cosec}\theta = \frac{13}{12}$, evaluate $\frac{2\sin\theta - 3\cos\theta}{4\sin\theta - 9\cos\theta}$.

7) In a right angled ΔABC, $\angle B = 90^0$.If $\frac{BC}{AB} = \frac{1}{\sqrt{3}}$, then find $\frac{AB}{AC}$

8) Express the trigonometric ratioscos A, tan A and sec A in terms of sin A

9) In ΔABC, right-angled at C find cos A, tan A and cosec B if sin A = $\frac{24}{25}$

10) In triangle ABC, right-angled at B, if tan A = $\frac{1}{\sqrt{3}}$, find the value of:

(i) sin A cos C + cos A sin C (ii) cos A cos C – sin A sin C

11) Prove that sec A (1 – sin A)(sec A + tan A) = 1.

12) If A, B and C are interior angles of a triangle ABC, then show that $\sin\frac{B+C}{2} = \cos\frac{A}{2}$

13) Evaluate: $\frac{\tan^2 60° + 4\cos^2 45° + 3\sec^2 30° + 5\cos^2 90°}{\operatorname{cosec} 30° + \sec 60° - \cot^2 30°}$

14) Prove that $\frac{\cos A - \sin A + 1}{\cos A + \sin A - 1} = \operatorname{cosec} A + \cot A$ using the identity $\operatorname{cosec}^2 A = 1 + \cot^2 A$.

15) Write all the other trigonometric ratios of $\angle$A in terms of $\sec A$.

16) Prove the following identity, where the angles involved are acute angles for which the expression is defined: $\sqrt{\frac{1+\sin A}{1-\sin A}}$ = sec A + tan A

17) In an acute angled triangle ABC if sin(A + B – C) = $\frac{1}{2}$ and cos(B + C – A)= $\frac{1}{\sqrt{2}}$ find $\angle A$, $\angle B$ and $\angle C$

18) Prove that : $\frac{1+tan^2 A}{1+cot^2 A} = \left(\frac{1-tanA}{1-cotA}\right)^2 = tan^2 A$

19) Evaluate : (i) $\frac{sin^2\ 63^0 + sin^2\ 27^0}{cos^2\ 17^0 + cos^2\ 73^0}$ (ii) $\sin 25^o \cos 65^o + \cos 25^o \sin 65^o$

20) In ΔOPQ, right-angled at P, OP = 7 cm and OQ – PQ = 1 cm. Determine the values of sin Q and cos Q.

21) If B and Q are acute angles such that sin B = sin Q, then prove that B = Q.

22) If sin (A – B) = $\frac{1}{2}$, cos (A + B) = $\frac{1}{2}$, 0° <A + B≤ 90°, A > B, find Aand B.

23) If sin 3A = cos (A – 26°), where 3A is an acute angle, find the value of A.

24) Prove that $\frac{\sin A - \cos A + 1}{\sin A + \cos A - 1} = \frac{1}{\sec A - \tan A}$, using the identity $\sec^2\theta = 1 + \tan^2\theta$.

25) Prove that $(\operatorname{cosec} A - \sin A)(\sec A - \cos A) = \frac{1}{\tan A + \cot A}$.