NDA 1 2025

LIVE

MATHS

STATISTICS - 2

MCQS

NAVJYOTI SIR

Crack
EXAMS

28 Feb 2025 Live Classes Schedule

9:00AM	28 FEBRUARY 2025 DAILY DEFENCE UPDATES	DIVYANSHU SIR
10:00AM	28 FEBRUARY 2025 DAILY CURRENT AFFAIRS	RUBY MA'AM

NDA 1 2025 LIVE CLASSES

10:00AM	MATHS - STATISTICS - CLASS 2	NAVJYOTI SIR
11:30AM	GK - INDIAN GEOGRAPHY - CLASS 2	RUBY MA'AM
1:00PM	CHEMISTRY - CLASS 4	SHIVANGI MA'AM
4:30PM	ENGLISH - USAGE OF PAIRED WORDS - CLASS 2	ANURADHA MA'AM

CDS 1 2025 LIVE CLASSES

11:30AM	GK - INDIAN GEOGRAPHY - CLASS 2	RUBY MA'AM
1:00PM	CHEMISTRY - CLASS 4	SHIVANGI MA'AM
4:30PM	ENGLISH - USAGE OF PAIRED WORDS - CLASS 2	ANURADHA MA'AM

Let $x-3y+4=0$ and $2x-7y+8=0$ be two lines of regression computed from some bivariate data. If b_{yx} and b_{xy} are regression coefficients of lines of regression of y on x and x on y respectively, then what is the value of $b_{xy}+7b_{yx}$?

(a) –2

(b) 1

(c) 2

(d) 5

$x - 3y + 4 = 0$

$b_{yx} = -\frac{1}{-3} = \frac{1}{3}$

$(y = mx+c)$

$2x - 7y + 8 = 0$

$b_{xy} = \frac{7}{2}$

$(x = my+c)$

$\frac{7}{2} + 7\left(\frac{1}{3}\right) = \frac{7}{2} + \frac{7}{3}$ (fraction)

$x - 3y + 4 = 0$

$b_{xy} = 3$

$2x - 7y + 8 = 0$

$b_{yx} = \frac{-2}{-7} = \frac{2}{7}$

$b_{xy} + 7 b_{yx} = 3 + 7\left(\frac{2}{7}\right) = 3 + 2 = 5$

Let $x-3y+4=0$ and $2x-7y+8=0$ be two lines of regression computed from some bivariate data. If b_{yx} and b_{xy} are regression coefficients of lines of regression of y on x and x on y respectively, then what is the value of $b_{xy}+7b_{yx}$?

(a) –2

(b) 1

(c) 2

(d) 5

Ans: (d)

The mean of n observations

$$1, 4, 9, 16, \cdots, n^2$$

is 130. What is the value of n?

(a) 18

(b) 19

(c) 20

(d) 21

$$1^2 + 2^2 + 3^2 + 4^2 + \cdots n^2 = \frac{n(n+1)(2n+1)}{6}$$

$$130 = \frac{\left(\frac{n(n+1)(2n+1)}{6}\right)}{n}$$

$$(n+1)(2n+1) = 130 \times 6$$

$$(n+1)(2n+1) = 780$$

(a) $19 \times 37 = 703$

(b) $20 \times 39 = 780$

The mean of n observations

$$1, 4, 9, 16, \cdots, n^2$$

is 130. What is the value of n?

(a) 18

(b) 19

(c) 20

(d) 21

Ans: (b)

What is the mean deviation of the first 10 natural numbers?

(a) 2

(b) 2·5

(c) 3

(d) 3·5

$$\frac{1+2+3+4+\ldots 10}{10} = \frac{\frac{10(11)}{2}}{10} = \frac{11}{2} = 5.5$$

$$\frac{\Sigma|(x_i - \bar{x})|}{n}$$

$$\frac{4.5 + 3.5 + 2.5 + 1.5 + 0.5 + 0.5 + 1.5 + 2.5 + 3.5 + 4.5}{10}$$

$$\frac{2(4.5 + 3.5 + 2.5 + 1.5 + 0.5)}{10} = \frac{12.5}{5} = 2.5$$

What is the mean deviation of the first 10 natural numbers?

(a) 2

(b) 2·5

(c) 3

(d) 3·5

Ans: (b)

Let $\sum_{i=1}^{9} x_i^2 = 855$. If M is the mean and σ is the standard deviation of $x_1, x_2, \cdots, x_9$, then what is the value of $M^2 + \sigma^2$?

(a) 100

(b) 95

(c) 90

(d) 85

$$\sum_{i=1}^{9} x_i^2 = 855$$

$$\sigma^2 = \frac{\sum x_i^2}{n} - \left(\frac{\sum x_i}{n}\right)^2$$

$$\frac{\sum x_i}{n} = \bar{x} \text{ (Mean)}$$

$$\sigma^2 = \frac{855}{9} - (M)^2$$

$$\sigma^2 + M^2 = 95$$

Let $\sum_{i=1}^{9} x_i^2 = 855$. If M is the mean and σ is the standard deviation of $x_1, x_2, \cdots, x_9$, then what is the value of $M^2 + \sigma^2$?

(a) 100

(b) 95

(c) 90

(d) 85

Ans: (b)

The mean of the series $x_1, x_2, \cdots, x_n$ is $\bar{x}$. If x_n is replaced by k, then what is the new mean?

(a) $\bar{x} - x_n + k$

(b) $\dfrac{n\bar{x} - \bar{x} + k}{n}$

(c) $\dfrac{\bar{x} - x_n - k}{n}$

(d) $\dfrac{n\bar{x} - x_n + k}{n}$

$$\frac{n\bar{x} - x_n + k}{n}$$

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(c) $\frac{\bar{x} - x_n - k}{n}$

(d) $\frac{n\bar{x} - x_n + k}{n}$

Ans: (d)

Q) It is given that $\bar{X}=10, \bar{Y}=90, \sigma_X=3, \sigma_Y=12$ and $r_{XY}=0.8$. The regression equation of X on Y is

(a) $Y=3.2X+58$ (b) $X=3.2Y+58$
(c) $X=-8+0.2Y$ ✓ (d) $Y=-8+0.2X$

$(\bar{x}, \bar{y})$ — passing point

slope — $\left(r_{xy}\frac{\sigma_x}{\sigma_y}\right)$

eqn $\Rightarrow$ $x-\bar{x}=r_{xy}\frac{\sigma_x}{\sigma_y}(y-\bar{y})$

$x-10=0.8\left(\frac{3}{12}\right)(y-90)$

$x-10=0.2(y-90)$

$x+8-0.2y=0$

$x=0.2y-8$

Q) It is given that $\bar{X}=10, \bar{Y}=90, \sigma_X=3, \sigma_Y=12$ and $r_{XY}=0.8$. The regression equation of X on Y is

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(b) $X=3.2Y+58$
(c) $X=-8+0.2Y$
(d) $Y=-8+0.2X$

Ans: (c)

Q) Consider the following statements:

1. If the correlation coefficient $r_{xy} = 0$, then the two lines of regression are parallel to each other.
2. If the correlation coefficient $r_{xy} = +1$, then the two lines of regression are perpendicular to each other.

Which of the above statements is/are correct?

(a) 1 only (b) 2 only
(c) Both 1 and 2 (d) Neither 1 nor 2

$$\tan\theta = \frac{1-r}{r}$$

1.) $\tan\theta = \infty \Rightarrow \theta = 90^\circ \Rightarrow$ Lines are perpendicular

2.) $\tan\theta = 0 \Rightarrow \theta = 0^\circ \Rightarrow$ Lines are parallel

Q) Consider the following statements:

1. If the correlation coefficient $r_{xy} = 0$, then the two lines of regression are parallel to each other.
2. If the correlation coefficient $r_{xy} = +1$, then the two lines of regression are perpendicular to each other.

Which of the above statements is/are correct?

(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

Ans: (d)

Q) If $4x - 5y + 33 = 0$ and $20x - 9y = 107$ are two lines of regression, then what are the values of $\bar{x}$ and $\bar{y}$ respectively?

(a) 12 and 18
(b) 18 and 12
(c) 13 and 17
(d) 17 and 13

$(\bar{x}, \bar{y})$ is the passing point for both lines of regression.

point of intersection

$4x - 5y = -33$ —— $\times 9$

$20x - 9y = 107$ —— $\times 5$

$36x - 45y = -297$

$100x - 45y = 535$

$\ominus$

$-64x = -832$

$x = \frac{832}{64} = 13$

Q) If $4x - 5y + 33 = 0$ and $20x - 9y = 107$ are two lines of regression, then what are the values of $\bar{x}$ and $\bar{y}$ respectively?

(a) 12 and 18
(b) 18 and 12
(c) 13 and 17
(d) 17 and 13

Ans: (c)

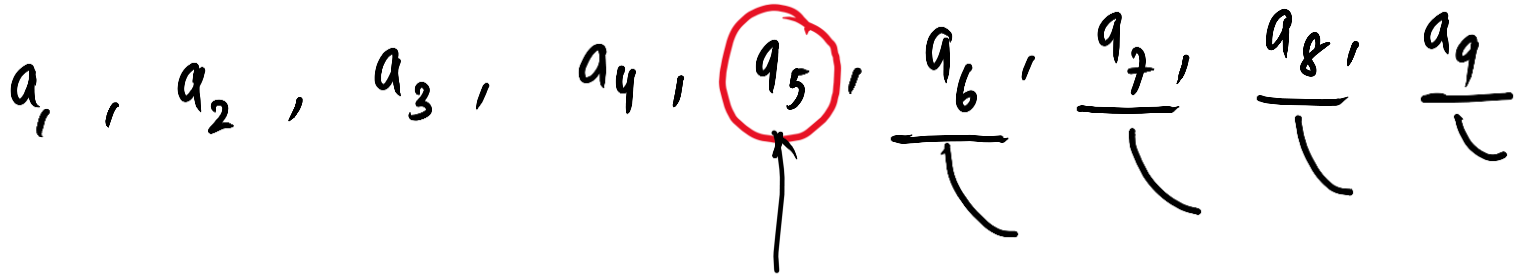
Q) The median of a set of 9 distinct observations is 20.5. If each of the largest 4 observations of the set is increased by 2, then the median of the new set

(a) remains the same as that of the original set

(b) is increased by 2

(c) is decreased by 2

(d) is two times the original median.



Q) The median of a set of 9 distinct observations is 20.5. If each of the largest 4 observations of the set is increased by 2, then the median of the new set

(a) remains the same as that of the original set

(b) is increased by 2

(c) is decreased by 2

(d) is two times the original median.

Ans: (a)

Q) Consider the following statements :

(A) Mode can be computed from histogram

(B) Median is not independent of change of scale

(C) Variance is independent of change of origin and scale.

continous frequency distribution

Which of these is / are correct ?

(a) (A), (B) and (C)

(b) only (B)

(c) only (A) and (B)

(d) only (A)

Q) Consider the following statements :

(A) Mode can be computed from histogram

(B) Median is not independent of change of scale

(C) Variance is independent of change of origin and scale.

Which of these is / are correct ?

(a) (A), (B) and (C)

(b) only (B)

(c) only (A) and (B)

(d) only (A)

Ans: (c)

Q) In a series of $2n$ observations, half of them equal a and remaining half equal $-a$. If the standard deviation of the observations is 2, then $|a|$ equals.

(a) $\frac{\sqrt{2}}{n}$ (b) $\sqrt{2}$

(c) 2 (d) $\frac{1}{n}$

$SD = 2$

$$\sqrt{\frac{\Sigma(x_i - \bar{x})^2}{2n}} = 2$$

$$\frac{\Sigma(x_i - \bar{x})^2}{2n} = 4$$

$a \text{ ------ } a, -a, -a \text{ ... } -a$

$n \qquad n$

$$\bar{x} = \frac{a + a \text{ ... } a + (-a) + (-a) + \text{ ... } (-a)}{2n} = \frac{0}{2n} = 0$$

$$\sum (x_i - \bar{x})^2 = (a-0)^2 + (a-0)^2 + \cdots (a-0)^2 + (-a-0)^2 + (-a-0)^2 + \cdots (-a-0)^2$$

$$= na^2 + na^2 = 2na^2$$

$$4 = \frac{\sum (x_i - \bar{x})^2}{2n}$$

$$4 = \frac{2na^2}{2n} \Rightarrow a^2 = 4$$

$$a = \pm 2 \qquad |a| = 2$$

Q) In a series of $2n$ observations, half of them equal a and remaining half equal $-a$. If the standard deviation of the observations is 2, then $|a|$ equals.

(a) $\frac{\sqrt{2}}{n}$

(b) $\sqrt{2}$

(c) 2

(d) $\frac{1}{n}$

Ans: (c)

Q) The arithmetic mean of 1, 8, 27, 64,..... up to n terms is given by

(a) $\frac{n(n+1)}{2}$

(b) $\frac{n(n+1)^2}{2}$

(c) $\frac{n(n+1)^2}{4}$

(d) $\frac{n^2(n+1)^2}{4}$

$1^3 + 2^3 + 3^3 + \ldots n^3 = \frac{n^2(n+1)^2}{4}$

$\text{Mean} = \frac{\frac{n^2(n+1)^2}{4}}{n} = \frac{n(n+1)^2}{4}$

Q) The arithmetic mean of 1, 8, 27, 64,..... up to n terms is given by

(a) $\frac{n(n+1)}{2}$

(b) $\frac{n(n+1)^2}{2}$

(c) $\frac{n(n+1)^2}{4}$

(d) $\frac{n^2(n+1)^2}{4}$

Ans: (c)

Q) The mean of the numbers a, b, 8, 5, 10 is 6 and the variance is 6.80. Then which one of the following gives possible values of a and b ?

(a) $a=0, b=7$ (b) $a=5, b=2$

(c) $a=1, b=6$ (d) $a=3, b=4$

$$6 = \frac{a+b+8+5+10}{5}$$

$$a+b = 30-23 = 7$$

$$\underline{\underline{a+b=7}}$$

$$\text{Variance} = \frac{\Sigma(x_i-\bar{x})^2}{n}$$

$$6.80 = \frac{(6-a)^2+(6-6)^2+(6-8)^2+(6-5)^2+(6-10)^2}{5}$$

$$34.00 = 36+a^2-12a+36+b^2-12b+4+1+16$$

$$34.00 = 36 + a^2 - 12a + 36 + b^2 - 12b + 4 + 1 + 16$$

$$34 = 72 + a^2 + b^2 - 12(a+b) + 21$$

$$a^2 + b^2 - 12(7) = 34 - 93$$

$$a^2 + b^2 = -69 + 84$$

$$\underline{a^2 + b^2 = 25}$$

(a) 0, 7 — $0^2 + 7^2 = 49$ ✗

(b) 5, 2 — $5^2 + 2^2 = 25 + 4 = 29$ ✗

(c) 1, 6 — $1^2 + 6^2 = 1 + 36 = 37$ ✗

(d) 3, 4 — $3^2 + 4^2 = 9 + 16 = 25$ ✓

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(a) $a=0, b=7$ (b) $a=5, b=2$

(c) $a=1, b=6$ (d) $a=3, b=4$

Ans: (d)

Q) In a study on the relationship between investment (X) and profit (Y), the following two regression equations were obtained based on the data on X and Y

$3X + Y - 12 = 0$

$X + 2Y - 14 = 0$

What is the mean $\overline{X}$?

(a) 6 (b) 5

(c) 4 (d) 2

Q) In a study on the relationship between investment (X) and profit (Y), the following two regression equations were obtained based on the data on X and Y

$3X + Y - 12 = 0$

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What is the mean $\overline{X}$?

(a) 6 (b) 5

(c) 4 (d) 2

Ans: (d)

Q) If the mean deviation of the numbers $1, 1+d, 1+2d, \ldots$ $1+100d$ from their mean is 255, then d is equal to :

(a) 20.0 (b) 10.1 (c) 20.2 (d) 10.0

$$\text{mean} = \frac{1 + (1+d) + (1+2d) + \ldots (1+100d)}{101} = \frac{101 + d(1+2+3+\ldots 100)}{101}$$

$$= 1 + \frac{d\,(100)(101)}{2(101)}$$

$$= 1 + 50d$$

$$\frac{50d + 49d + 48d + \ldots + 0 + d + 2d + \ldots 49d + 50d}{101} = 255$$

$$2d(50 + 49 + 48 + \ldots 1) = 25755$$

$$2d = \frac{25755}{\left(\frac{50(51)}{2}\right)} \Rightarrow d = \frac{25755}{50 \times 51} = \frac{101}{10} = 10.1$$

$$d = 10.1$$

$$\begin{array}{r} 25500 \\ 255 \\ \hline 25755 \end{array}$$

Q) If the mean deviation of the numbers $1, 1 + d, 1 + 2d, \ldots$ $1 + 100d$ from their mean is 255, then d is equal to :

(a) 20.0 (b) 10.1 (c) 20.2 (d) 10.0

Ans: (b)

Q) Consider the following statements in respect of histogram :

1. The histogram is a suitable representation of a frequency distribution of a continuous variable.
2. The area included under the whole histogram is the total frequency.

Which of the above statements is/are correct?

(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

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Which of the above statements is/are correct?

(a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

Ans: (a)

Q) The mean of the data set comprising of 16 observations is 16. If one of the observation valued 16 is deleted and three new observations valued 3, 4 and 5 are added to the data, then the mean of the resultant data, is:

(a) 15.8 (b) 14.0 (c) 16.8 (d) 16.0

Q) The mean of the data set comprising of 16 observations is 16. If one of the observation valued 16 is deleted and three new observations valued 3, 4 and 5 are added to the data, then the mean of the resultant data, is:

(a) 15.8 (b) 14.0 (c) 16.8 (d) 16.0

Ans: (b)

Q) If the standard deviation of the numbers 2, 3, a and 11 is 3.5, then which of the following is true?

(a) $3a^2 - 34a + 91 = 0$

(b) $3a^2 - 23a + 44 = 0$

(c) $3a^2 - 26a + 55 = 0$

(d) $3a^2 - 32a + 84 = 0$

Q) If the standard deviation of the numbers 2, 3, a and 11 is 3.5, then which of the following is true?

(a) $3a^2 - 34a + 91 = 0$ (b) $3a^2 - 23a + 44 = 0$

(c) $3a^2 - 26a + 55 = 0$ (d) $3a^2 - 32a + 84 = 0$

Ans: (d)

Q) The regression lines will be perpendicular to each other if the coefficient of correlation r is equal to

(a) 1 only
(b) 1 or –1
(c) –1 only
(d) 0

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(a) 1 only
(b) 1 or –1
(c) –1 only
(d) 0

Ans: (d)