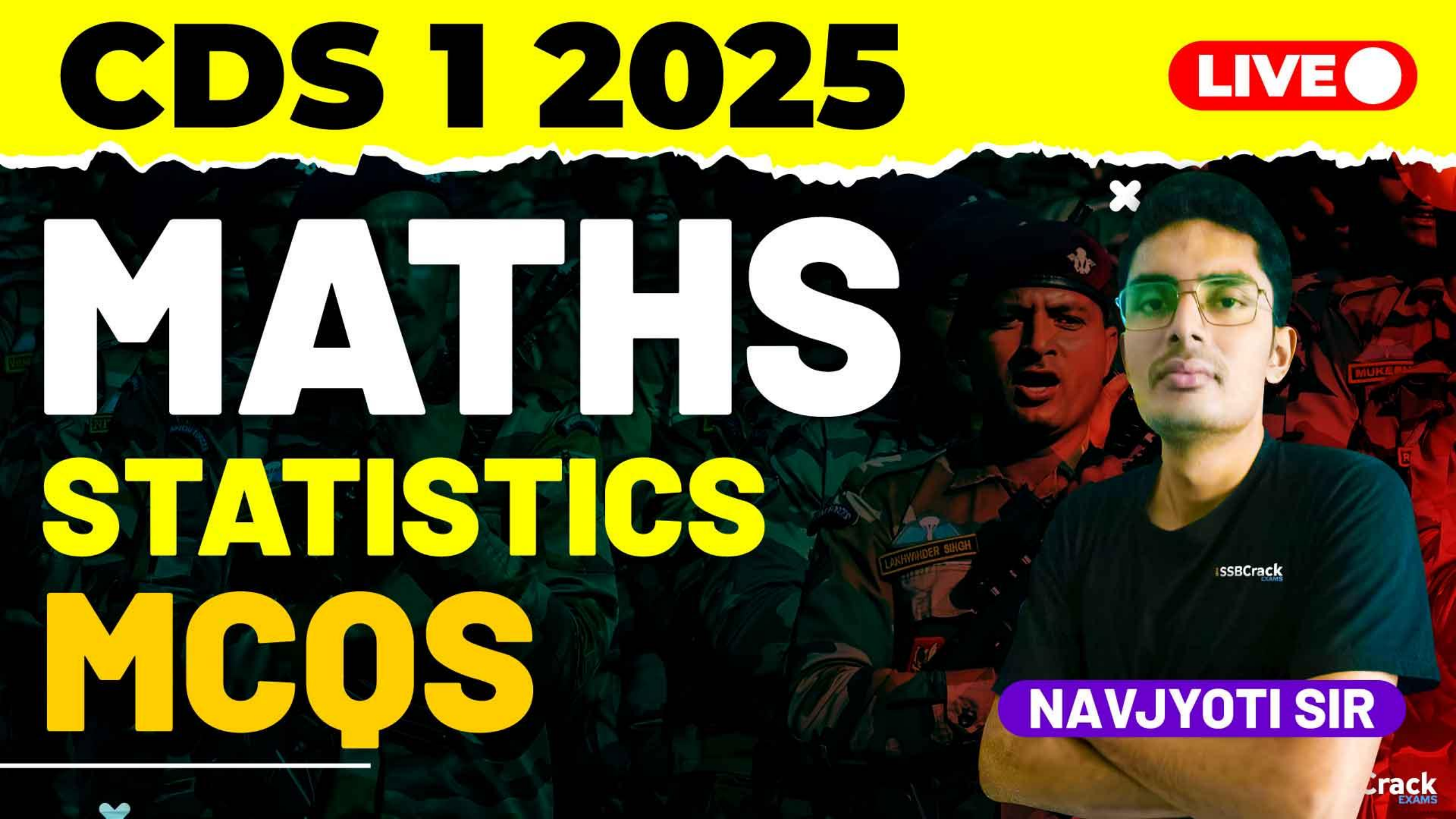
CDS 1 2025

LIVE

MATHS

STATISTICS

MCQS



19 Feb 2025 Live Classes Schedule

9:00AM	19 FEBRUARY 2025 DAILY DEFENCE UPDATES	DIVYANSHU SIR
10:00AM	19 FEBRUARY 2025 DAILY CURRENT AFFAIRS	RUBY MA'AM

SSB INTERVIEW LIVE CLASSES

9:30AM	MOCK PERSONAL INTERVIEWS	ANURADHA MA'AM

AFCAT 1 2025 LIVE CLASSES

12:00PM	AFCAT 1 2025 MAHA MARATHON - PART 1	

NDA 1 2025 LIVE CLASSES

10:00AM	MATHS - INTEGRATION - CLASS 1	NAVJYOTI SIR
11:30AM	GK - CLIMATOLOGY - CLASS 2	RUBY MA'AM
1:00PM	BIOLOGY - CLASS 8	SHIVANGI MA'AM
4:30PM	ENGLISH - ORDERING OF WORDS - CLASS 2	ANURADHA MA'AM

CDS 1 2025 LIVE CLASSES

11:30AM	GK - CLIMATOLOGY - CLASS 2	RUBY MA'AM
1:00PM	BIOLOGY - CLASS 8	SHIVANGI MA'AM
4:30PM	ENGLISH - ORDERING OF WORDS - CLASS 2	ANURADHA MA'AM
5:30PM	MATHS - STATISTICS	NAVJYOTI SIR

PYQ – 2024 - II

A frequency distribution is as follows :

Marks	18-26	27-35	36-44	45-53	54-62	63-71	72-80
Number of students	5	7	10	15	8	3	2

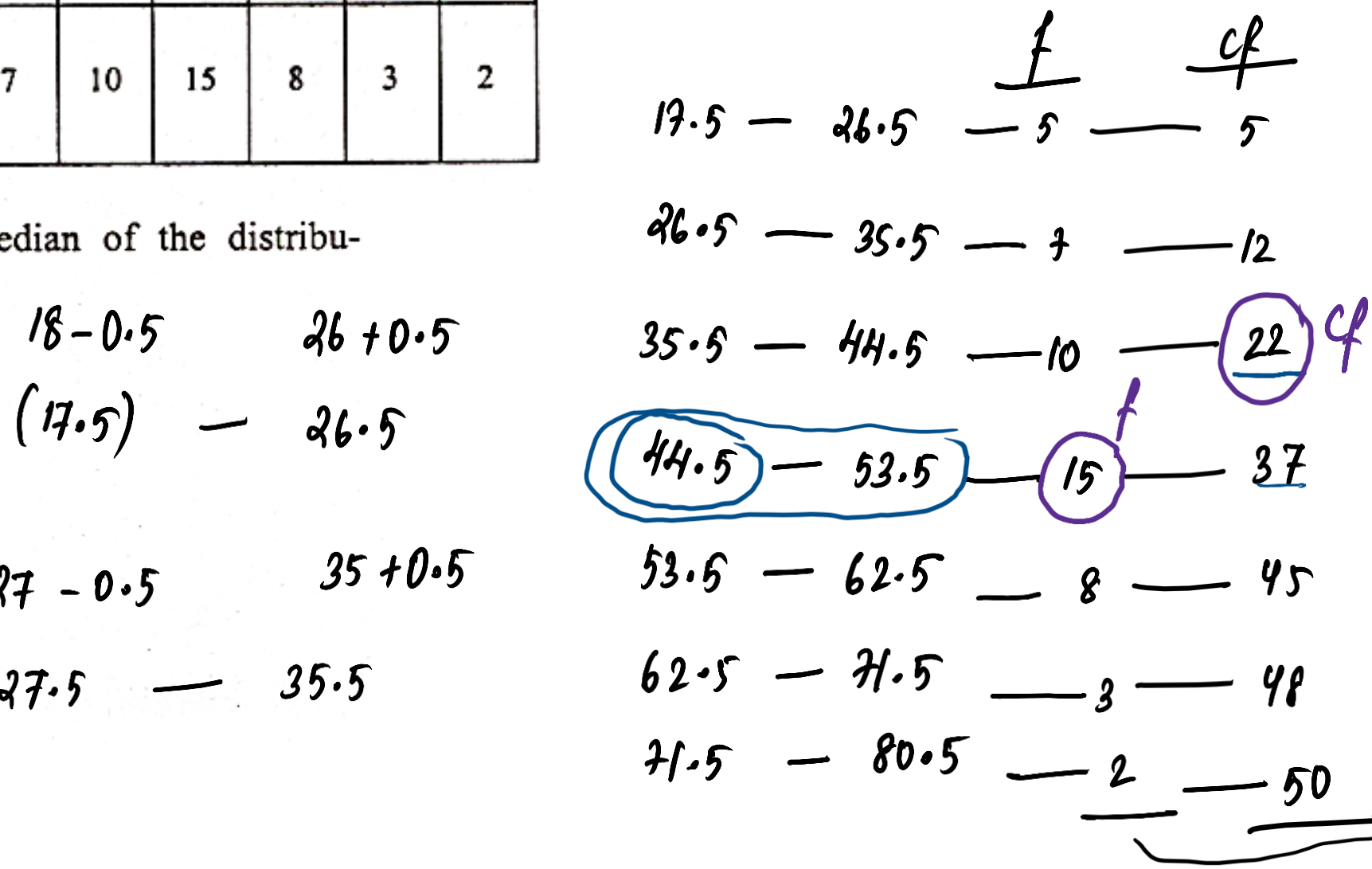
What is the median of the distribution ?

(a) 44·9

(b) 45·5

(c) 45·9

(d) 46·3



$n = \Sigma f = 50$

$\frac{n}{2} = 25$

$$\text{median} = l + \frac{\left(\frac{n}{2} - cf\right)}{f} \times h$$

$$= 44.5 + \frac{(25 - 22)}{15} \times 9$$

$44.5 + \frac{3}{15} \times 9$

$44.5 + \frac{9}{5}$

$44.5 + 1.8$

$= 46.3$

PYQ – 2024 - II

A frequency distribution is as follows :

Marks	18-26	27-35	36-44	45-53	54-62	63-71	72-80
Number of students	5	7	10	15	8	3	2

What is the median of the distribution ?

(a) 44·9

(b) 45·5

(c) 45·9

(d) 46·3

Ans: (d)

What is the mode of the distribution ?

PYQ – 2024 - II

(a) 47·25

(b) 47·75

(c) 48·25

(d) 48·75

A frequency distribution is as follows :

Marks	18-26	27-35	36-44	45-53	54-62	63-71	72-80
Number of students	5	7	10	15	8	3	2

$$\text{mode} = l + \left(\frac{f_1 - f_0}{2f_1 - f_0 - f_2}\right) \times h$$

$$= 44.5 + \left(\frac{15 - 10}{2 \times 15 - 10 - 8}\right) \times 9$$

		f
17.5 – 26.5		5
26.5 – 35.5		7
35.5 – 44.5		10 f_0
44.5 – 53.5		15 f_1
53.5 – 62.5		8 f_2
62.5 – 71.5		3
71.5 – 80.5		2
		50

$$= 44.5 + \left(\frac{15-10}{2\times15-10-8}\right) \times 9$$

$$= 44.5 + \frac{5}{4} \times 3$$

$$= 44.5 + \frac{15}{4}$$

$$= 44.5 + 3.75$$

$$= \underline{48.25}$$

What is the mode of the distribution ?

PYQ – 2024 - II

(a) 47·25

(b) 47·75

(c) 48·25

(d) 48·75

Ans: (c)

PYQ – 2024 - II

The arithmetic mean of n numbers is M. If the sum of first $(n-1)$ terms is k, then what is the nth number ?

(a) $M - k$

(b) $nM - k$

(c) $n(M - k)$

(d) $M - nk$

Sum of 'n' numbers $= nM$

n^{th} number = sum of 'n' numbers − sum of '(n−1)' numbers

$= nM - k$

PYQ – 2024 - II

The arithmetic mean of n numbers is M. If the sum of first $(n-1)$ terms is k, then what is the nth number ?

(a) $M - k$

(b) $nM - k$

(c) $n(M - k)$

(d) $M - nk$

Ans: (b)

PYQ – 2024 - II

What is the geometric mean of 3, 9, 27, 81, 243, 729, 2187 ?

(a) 81

(b) 105

(c) 144

(d) 243

$3, 3^2, 3^3, 3^4, 3^5, 3^6, 3^7$

$GM = (3 \cdot 3^2 \cdot 3^3 \cdot 3^4 \cdot 3^5 \cdot 3^6 \cdot 3^7)^{\frac{1}{7}}$

$= (3^{\frac{7 \times 8}{2}})^{\frac{1}{7}} = 3^4 = 81$

PYQ – 2024 - II

What is the geometric mean of 3, 9, 27, 81, 243, 729, 2187 ?

(a) 81

(b) 105

(c) 144

(d) 243

Ans: (a)

PYQ – 2024 - I

Let the positive numbers $a_1, a_2, a_3, \ldots, a_{3n}$ be in GP. If P is the GM of $a_1, a_2, a_3, \ldots, a_n$ and Q is the GM of $a_{n+1}, a_{n+2}, a_{n+3}, \ldots, a_{3n}$, then what is the GM of 3n numbers ?

(a) P^2Q

(b) PQ^2

(c) $\sqrt{PQ}$

(d) $P^{1/3}\,Q^{2/3}$

$$P = (a_1 a_2 a_3 \cdots a_n)^{\frac{1}{n}}$$

$$Q = (\underbrace{a_{n+1}\ a_{n+2} \cdots a_{n+n}}_{n},\ \underbrace{a_{n+n+1} \cdots a_{n+n+n}}_{n})^{\frac{1}{2n}}$$

$$(\underbrace{a_1 \cdots a_n}_{},\ \underbrace{a_{n+1} \cdots a_{2n}}_{},\ \underbrace{a_{2n+1} \cdots a_{3n}}_{})^{\frac{1}{3n}}$$

$$(P^n \cdot Q^{2n})^{\frac{1}{3n}} = P^{\frac{1}{3}} Q^{\frac{2}{3}}$$

PYQ – 2024 - I

Let the positive numbers $a_1, a_2, a_3, \ldots, a_{3n}$ be in GP. If P is the GM of $a_1, a_2, a_3, \ldots, a_n$ and Q is the GM of $a_{n+1}, a_{n+2}, a_{n+3}, \ldots, a_{3n}$, then what is the GM of 3n numbers ?

(a) P^2Q

(b) PQ^2

(c) $\sqrt{PQ}$

(d) $P^{1/3}\,Q^{2/3}$

Ans: (d)

QUESTION

The following observation have been arranged in ascending order:

29, 32, 48, 52, x, x + 3, 71, 75, 80, 92

If the median of data is 61.5, then what is the value of x?

(a) 54 (b) 60

(c) 62 (d) 56

no. of observations = 10 ⇒ even

(n)

$$\text{median} = \frac{1}{2}\left(\left(\frac{n}{2}\right)^{th} + \left(\left(\frac{n}{2}\right)+1\right)^{th}\right)$$

$$61.5 = \frac{1}{2}(x + x + 3)$$

$$123 = 2x + 3$$

$$2x = 120$$

$$x = 60$$

QUESTION

The following observation have been arranged in ascending order:

$$29, 32, 48, 52, x, x + 3, 71, 75, 80, 92$$

If the median of data is 61.5, then what is the value of x?

(a) 54 (b) 60

(c) 62 (d) 56

ANSWER : (b)

QUESTION

If mean of y and $\frac{1}{y}$ is M, then what is the mean of y^3 and $\frac{1}{y^3}$?

(a) $\frac{M(M^2-3)}{3}$ (b) M^3

(c) $M^3 - 3$ (d) $M(4M^2 - 3)$

$$y + \frac{1}{y} = 2M$$

$$\frac{y^3 + \frac{1}{y^3}}{2} = \frac{\left(y + \frac{1}{y}\right)^3 - 3\left(y + \frac{1}{y}\right)}{2}$$

$$= \frac{(2M)^3 - 3(2M)}{2}$$

$$= 4M^3 - 3M = M(4M^2 - 3)$$

QUESTION

If mean of y and $\frac{1}{y}$ is M, then what is the mean of y^3 and $\frac{1}{y^3}$?

(a) $\frac{M\left(M^2-3\right)}{3}$

(b) M^3

(c) $M^3 - 3$

(d) $M(4M^2 - 3)$

ANSWER : (d)

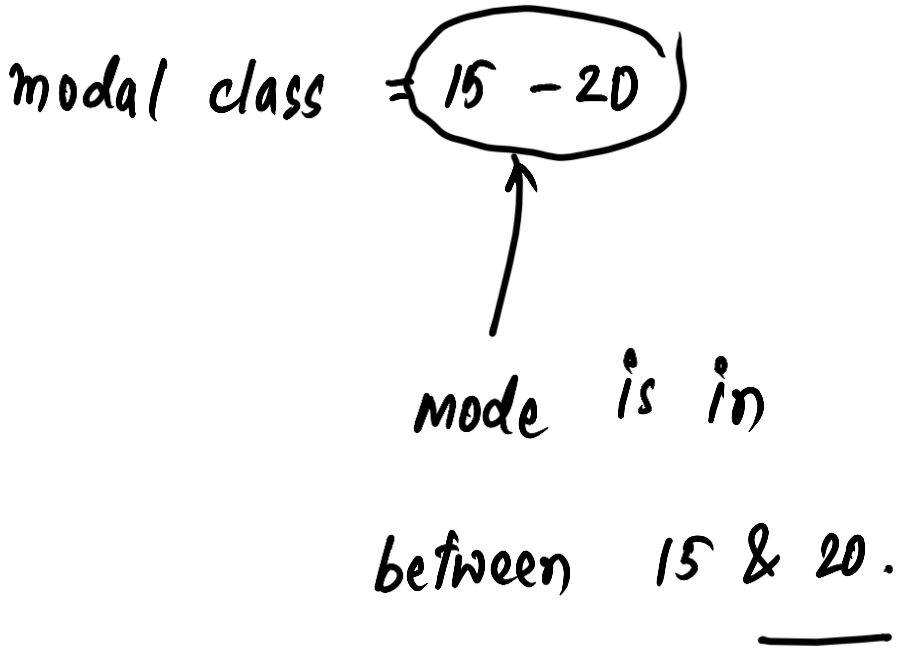
QUESTION

For the following frequency distribution:

Class interval	0-5	5-10	10-15	15-20	20-25	25-30
Frequency	10	15	30	80	40	20

If m is the value of mode, then which one of the following is correct?

(a) $5 < m < 10$
(b) $10 < m < 15$
(c) $15 < m < 20$
(d) $20 < m < 25$



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(a) $5 < m < 10$
(b) $10 < m < 15$
(c) $15 < m < 20$
(d) $20 < m < 25$

ANSWER : (c)

QUESTION

An average Indian family allocates its monthly income under different heads as follows:

Items	Percentage Share
Food	40
House Rent	15
Saving	x
Transport	12
Miscellaneous	23

A pie diagram of this data is to be drawn. What is the value of x, if the angle which the sector representing saving makes at the centre is 36°?

(a) 13 (b) 11
(c) 10 (d) 8

$$\frac{360}{x+12+23+15+40} = \frac{x}{}$$

$\times 360^{10}$

$$\frac{1}{10} = \frac{x}{90+x}$$

$$90 + x = 10x$$

$$x = 10$$

QUESTION

An average Indian family allocates its monthly income under different heads as follows:

Items	Percentage Share
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House Rent	15
Saving	x
Transport	12
Miscellaneous	23

A pie diagram of this data is to be drawn. What is the value of x, if the angle which the sector representing saving makes at the centre is 36°?

(a) 13 (b) 11
(c) 10 (d) 8

ANSWER : (c)

QUESTION

Suppose X is some statistical variable with mean μ. Let $x_1, x_2, \ldots x_n$ be its deviations from mean with the respective frequencies $f_1, f_2, \ldots, f_n$. What is the value of the sum $x_1 f_1 + x_2 f_2 + \ldots + x_n f_n$? **[2008-II]**

(a) 0
(b) 1
(c) μ
(d) $\mu + 1$

Mean = μ

$x_1 = \mu - y_1$

$x_2 = \mu - y_2$

$\vdots$

$x_n = \mu - y_n$

y	frequency (f)
y_1	f_1
y_2	f_2
y_3	f_3
$\vdots$	
y_n	f_n

$$\mu = \frac{\Sigma y_i f_i}{\Sigma f_i}$$

$$x_1 f_1 + x_2 f_2 + \cdots x_n f_n$$

$$= (\mu - y_1) f_1 + (\mu - y_2) f_2 + \cdots (\mu - y_n) f_n$$

$$= \mu (f_1 + f_2 + f_3 + \cdots f_n) - [y_1 f_1 + y_2 f_2 + \cdots y_n f_n]$$

$$= \frac{\Sigma y_i f_i}{\Sigma f} (\Sigma f) - \Sigma y_i f_i = 0$$

QUESTION

Suppose X is some statistical variable with mean μ. Let $x_1, x_2, \ldots x_n$ be its deviations from mean with the respective frequencies $f_1, f_2, \ldots, f_n$. What is the value of the sum $x_1 f_1 + x_2 f_2 + \ldots + x_n f_n$? **[2008-II]**

(a) 0
(b) 1
(c) μ
(d) $\mu + 1$

ANSWER : (a)

QUESTION

Data on percentage distribution of area of land in acres owned by households in two districts of a particular state are as follows:

Land Holding	District A	District B
0.01 – 0.99	5.62	13.53
1.0 – 2.49	18.35	21.84
2.5 – 7.49	47.12	39.32
7.5 – 12.49	19.34	12.15
12.5 – 19.99	7.21	7.43
20.0 – 29.99	2.36	5.73

What is the appropriate diagram to represent the above data? **[2009-I]**

(a) Pie diagram
(b) Histogram
(c) Bar chart
(d) None of the above

QUESTION

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0.01 – 0.99	5.62	13.53
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7.5 – 12.49	19.34	12.15
12.5 – 19.99	7.21	7.43
20.0 – 29.99	2.36	5.73

What is the appropriate diagram to represent the above data? **[2009-I]**

(a) Pie diagram
(b) Histogram
(c) Bar chart
(d) None of the above

ANSWER : (c)

QUESTION

The geometric mean of x and y is 6 and the geometric mean of x, y and z is also 6. Then the value of z is **[2017-II]**

(a) 12 (b) $\sqrt{6}$

(c) 6 (d) $\sqrt[3]{6}$

$(xy)^{\frac{1}{2}} = 6 \Rightarrow xy = 6^2 = 36$ —— (1)

$(xyz)^{\frac{1}{3}} = 6$

$xyz = 6^3$ | $xyz = 216$

$z = \frac{216}{36} = \underline{6}$

QUESTION

The geometric mean of x and y is 6 and the geometric mean of x, y and z is also 6. Then the value of z is **[2017-II]**

(a) 12

(b) $\sqrt{6}$

(c) 6

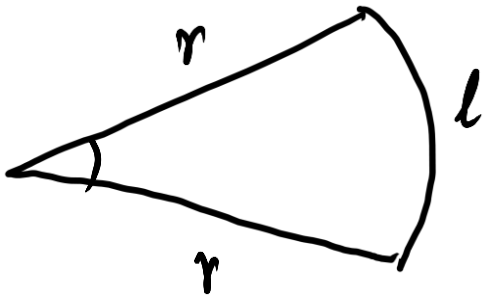
(d) $\sqrt[3]{6}$

ANSWER : (c)

QUESTION

Which one of the following is not correct?
The proportion of various items in a pie diagram is proportional to the **[2017-II]**

(a) Areas of slices
(b) Angles of slices
(c) Lengths of the curved arcs of the slices
(d) Perimeters of the slices //



$l + 2r$

QUESTION

Which one of the following is not correct?

The proportion of various items in a pie diagram is proportional to the **[2017-II]**

(a) Areas of slices

(b) Angles of slices

(c) Lengths of the curved arcs of the slices

(d) Perimeters of the slices

ANSWER : (d)

QUESTION

The weighted arithmetic mean of first 10 natural numbers whose weights are equal to the corresponding numbers is equal to **[2015-II]**

(a) 7 (b) 14

(c) 35 (d) 38.5

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

x_i —— w_i (frequency)

1 —— 1

2 —— 2

3 —— 3

4 —— 4

⋮

10 —— 10

$$\frac{1\times1+2\times2+3\times3+\dots 10\times10}{1+2+3+4+\dots 10} = \frac{2n+1}{3}$$

$$= \frac{2(10)+1}{3} = \frac{21}{3} = 7$$

QUESTION

The weighted arithmetic mean of first 10 natural numbers whose weights are equal to the corresponding numbers is equal to **[2015-II]**

(a) 7
(b) 14
(c) 35
(d) 38.5

ANSWER : (a)

QUESTION

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 **[2016-II]**

(a) is increased by 2
(b) is decreased by 2
(c) is two times the original median
(d) remains the same as that of original set

$a_1 \quad a_2 \quad a_3 \quad a_4 \quad \underline{a_5} \quad a_6 \quad a_7 \quad a_8 \quad a_9 \quad (a_1 < a_2 < a_3 \ldots a_9)$

$\uparrow$

20.5

QUESTION

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 **[2016-II]**

(a) is increased by 2
(b) is decreased by 2
(c) is two times the original median
(d) remains the same as that of original set

ANSWER : (d)

QUESTION

The geometric mean of $(x_1, x_2, x_3, ..., x_n)$ is X and the geometric mean of $(y_1, y_2, y_3, ..., y_n)$ is y. Which of the following is/are correct?

I. The geometric mean of $(x_1 y_1, x_2 y_2, x_3 y_3, ..., x_n y_n)$ is XY.

II. The geometric mean of $\left(\frac{x_1}{y_1}, \frac{x_2}{y_2}, \frac{x_3}{y_3}, ..., \frac{x_n}{y_n}\right)$ is $\frac{X}{Y}$.

Select the correct answer using the code given below.

[2014-I]

(a) Only I
(b) Only II
(c) Both I and II
(d) Neither I nor II

$$x^n = x_1 \cdot x_2 \cdot x_3 \cdots x^n$$

$$y^n = y_1 \cdot y_2 \cdot y_3 \cdots y^n$$

$$\left[(x_1 \cdot x_2 \cdots x_n)(y_1 \cdot y_2 \cdot y_3 \cdots y_n)\right]^{\frac{1}{n}}$$

$$\left[x^n \cdot y^n\right]^{\frac{1}{n}} = \left[(xy)^n\right]^{\frac{1}{n}} = xy$$

$$\left(\frac{x^n}{y^n}\right)^{\frac{1}{n}} = \frac{x}{y}$$

QUESTION

The geometric mean of $(x_1, x_2, x_3, ..., x_n)$ is x and the geometric mean of $(y_1, y_2, y_3, ..., y_n)$ is y. Which of the following is/are correct?

I. The geometric mean of $(x_1\, y_1, x_2\, y_2, x_3\, y_3, ..., x_n\, y_n)$ is XY.

II. The geometric mean of $\left(\frac{x_1}{y_1}, \frac{x_2}{y_2}, \frac{x_3}{y_3}, ..., \frac{x_n}{y_n}\right)$ is $\frac{X}{Y}$.

Select the correct answer using the code given below.

[2014-I]

(a) Only I
(b) Only II
(c) Both I and II
(d) Neither I nor II

ANSWER : (c)

CDS 1 2025

LIVE

MATHS

LOGARITHMS & SET THEORY

MCQS

NAVJYOTI SIR

Crack EXAMS