MATHS

BOOKS - PEARSON IIT JEE FOUNDATION

STATISTICS

Example

1. Represent the following frequency distribution by a bar graph :

Value of variable	2	4	6	8	10
Frequency	5	8	4	2	7

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2. Construct a histogram for the following frequency distribution :

Class Interval	20–30	30–40	40–50	50–60	60–70
Frequency	5	8	3	7	4

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3. Construct a frequency polygon for the following data :

Class Interval	12–17	18–23	24–29	30–35	36–41	Total
Frequency	10	7	12	8	13	50

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4. Draw a frequency curve for the following data :

Mid-values	5	10	15	20	25	30	35	40
Frequency	2	4	7	5	10	12	6	4

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5. For the given distribution , draw the less than and greater than cumulative frequency curves .

Class	10–20	20–30	30–40	40–5	50–60	60–70	70–80	80–90	90–100
Frequency	2	4	5		17	12	6	4	3

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6. Find the mean of the first 10 natural numbers .

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7. The salaries of 100 workers of a factory are given below :

Salary (in Rs.)	Number of Workers
6000	40
8000	25
10000	12

ltimg

Find the mean salaries of the workers of the factory .

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8. If the average wage of 50 workers is ₹ 100 and the average wage of 30 of them is ₹ 120 , then find the average wage of the remaining workers .

(a) ₹ 80 (b) ₹ 70 (c) ₹ 85 (d) ₹ 75

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x	2	4	6	8
f	3	5	6	y

9.

The mean of the above data is 5.5 . Find the

missing frequency y in the above distribution .

(a) 6 (b) 8 (c) 15 (d) 11

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10. Find the median of the following data : 2, 7 , 3 , 15 , 12 , 17 and 5 .

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11. Find the median of the data 5, 8 , 4, 12 , 16 and 10 .

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12. A sequence , a , ax , $ax^2, \ldots\ldots ax^n$, has odd number of terms . Find its median .

(a) ax^{n-1} (b) $ax^{(n/2)-1}$ (c) $ax^{n/2}$ (d) $ax^{(n/2)+1}$

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13. Find the mode of 0, 5 , 2 , 7 , 2 , 1 , 1, 3 , 2 , 4 , 5 , 7 , 5 , 1 and 2 .

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14. Find the mode when median is 12 and mean is 16 of a data .

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15. Calculate the arithmetic mean (AM) of the following data :

Percentage of marks	0–20	20–40	40–60	60–80	80–100
Number of students	2	12	13	15	

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16. Following is the data showing weights of 40 students in a class . Find its median .

Weight	45	46	47	48	49.	50	51	52	53
Number of students	6	2	3	4	7	4	7	4	3

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17. Find the median of the following data :

Class interval	0–10	10–20	20–30	3 0	40–50
Frequency	7	6	5	8	9

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18. The following information gives the monthly salaries of 100 employees . Find the mode of the data .

Salary (₹)	2000–3499	3500–4999	5000–6499	6500–7999	8000–9499
Number of Persons	35	37	21	12	5

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19. Mode for the following distribution is 22 and $10 > y > x$. Find y .

Class interval	0–10	10–20	20–30	30–40	40–50	Total
Frequency	5	8	10	x	y	30

(a) 2 (b) 5 (c) 3 (d) 4

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20. Find the range of { 2 , 7 , 6 , 4 , 3 , 8 , 5 , 12}.

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21. Calculate variance and standard deviation of the following data : 10 , 12 , 8 , 14 , 16 .

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22. Calculate SD for the given data :

f	1	2	3	4
x	5	10	15	20

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23. Find the SD for the given data :

CI	0–10	10–20	20–30	30–40
Frequency	4	3	2	1

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24. If the standard deviation of $2x_i + 3$ is 8 , then the variance of $\frac{3x_i}{2}$.

(a) 24 (b) 36 (c) 6 (d) 18

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25. In a series of observations , find the coefficient of variation , given SD = 12.5 and AM = 50 .

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26. Find Q_1 for 8 , 12 , 7 , 5 , 16 , 10 ,21 and 19 .

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27. Find Q_1 of the observations 21 , 12 , 9 , 6 , 18 , 16 and 5 .

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28. The marks of 10 students in a class are 38 , 24 , 16 , 40 , 25 , 27 , 17 , 32 , 22 and 26 . Find Q_1

.

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29. Find Q_3 for 7 , 16 , 19 , 10 and 21 and 12 .

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30. Find semi-inter quartile range of the following data :

X	2	5	6	8	9	10	12
Frequency	1	8	12	16	11	9	3

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31. The heights of 31 students in a class are given below :

Height (in cm)	126	127	128	129	130	131	132
Number of Students	7	3	4	2	5	6	4

1 . Find the median of the above frequency distribution.

2. Find the semi-interquartile range of the above frequency distribution .

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32. The following table shows the distribution of the weight of a group of students :

Weight in Kg	30–35	35–40	40–45	45–50	50–55	55–60	60–65
No. of students	5	6	7	5	4	3	2

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33. Estimate mode of the following data from the histogram :

CI	0–10	10–20	20–30	30–40	40–50	50–60	60–70
Frequency	10	16	17	20	15	13	12

From the graph, mode (M) = 34

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Very Short Answer Type Questions

1. The class marks of a class is 25 , and if the upper limit of that class is 40 , then its lower limit is _____

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2. Consider the data 2,3,2,4,5,6 , 4, 2, 3, 3, 7 , 8 , 2,2 . The frequency of 2 is _____

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3. 1-5 , 6-10 , 11-15 , ... , are the classes of a distribution , the upper boundary of the class 1-5 is _____

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4. 0-10 , 10 - 20 , 20 - 30 , ..., are the classes , the lower boundary of the class 20-30 is _____.

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5. The mid value of 20-30 is _____.

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6. If 1-5 , 6-10 , 11-15 , ..., are the classes of a frequency distribution , then the size of the class is _____.

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7. A class interval of data has 15 as the lower limit and 25 as the size . Then the class mark is _____.

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8. In a histogram , the _____ of all rectangles are equal . (width/ length/ area)

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9. The sum of 12 observations is 600 , then their mean is _____.

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10. If the lower boundary of the class is 25 and the size of the class is 9 , then the upper boundary of the same class _____.

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11. If 1-5 , 6 -10 , 11-15 , 16-20, ..., are the classes of a frequency distribution , then the lower boundary of the class 11-15 is _____.

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12. Arithmetic mean of first n natural numbers is _____.

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13. The width of a rectangle in a histogram represents frequently of the class. (True / False)

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14. If 16 observations are arranged in ascending order , then the median is $\frac{8th \text{ observation} + 9th \text{observation}}{2}$. (True /False) .

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15. The mean of x, y , z is y , then x + z = 2y .

(True / False)

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16. Range of the series 25 , 33 , 44 , 26 , 17 is

_____.

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17. Upper quartile of the data 4, 6 , 7 , 8 , 9 is _____.

18. 2 (Median - Mean) = Mode - Mean . (True / False).

19. Lower quartile of the data 5 , 7 , 8 , 9 , 10 is _____.

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20. Consider the data : 2 , x , 3 , 4 , 5 ,2 , 4, 6 ,4 , where $x > 2$. The mode of the data is _____.

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21. Find the mean and median of the data is 10 , 15 , 17 , 19 , 20 and 21 .

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22. Find the semi-inter quartile range of the data : 32 , 33 , 38 , 39 , 36 , 37 , 40 , 41 , 47 , 34 , and 49 .

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23. Find the mean of first 726 natural numbers

.

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24. Find the range of the data : 14 , 16 , 20 , 12 ,

13 , 4 , 5 , 7 , 29 , 32 and 6.

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25. Find the mean of the observations 425 , 430 , 435, 440 , 445 , ..., 495 . (Difference between any two given consecutive observationis equal)

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26. The mean of 10 observations is 15.5 . By an error , one observation is registered as 13 instead of 34. Find the actual mean .

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27. Observation of the certain date are $\frac{x}{8}, \frac{x}{4}, \frac{x}{2}, x, \frac{x}{16}$ where x > 0 . If median of the given data is 8 , then find the mean of the given data .

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28. The mean of 12 observations is 14 . By an error, one observation is registered as 24 instead of -24 .

Find the actual mean.

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29. The mean weight of 20 students is 25 kg and the mean weight of another 10 students in 40 kg . Find the mean weight of the 30 students .

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30. Find the variance and standard deviation of the scores 7 , 8 , 9 , 10 and 16.

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Short Answer Type Questions

1. Tabulate , the given data by taking

Class intervals : 1-10 , 11- 20 , 21- 30 , 31- 40

Data : 9 , 10 , 8 , 6 , 7 , 4 , 3 , 2, 16 , 28 , 22 , 36 , 24 , 18 , 27 , 35 , 19 , 29 , 23 , 34.

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2. If the mean and the median of a unimodel data are 34.5 and 32.5 , then find the mode of the data .

3. The heights of 100 students in primary classes is classified as follows . Find the

median .

Height (in cm)	Number of Students
81	22
82	14
83	26
84	23
85	15

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4. The weight (in kg) of 25 children of 9th class is given . Find the mean weight of the

children .

Weight (in kg)	Number of Children
40	3
41	4
42	6
43	2
44	5
45	5

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5. If the mean of the following data is 5.3 , then find the missing frequency y of the following

distribution :

x	f
4	11
8	2
6	3
7	γ

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6. The mean of the data is 15 . If each observation is dividend by 5 and 2 is added to each results , then find the mean of the observations so obtained .

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7. Draw the histogram for the following distribution :

Marks	Number of Students
0–10	3
10–20	4
20–30	8
30–40	9
40–50	6

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8. Find the mode of the following data :

Class Interval	Frequency
1–5	3
6–10	4
11–15	10
16–20	6
21–25	7

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9. A six-faced balanced dice is rolled 20 times and the frequency distribution of the integers obtained is given below . Find the inter

quartile range .

Integer	Frequency
1	3
2	4
3	2
4	5
5	4
6	2

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10. Draw the frequency polygon for the following distribution :

Class Interval	Frequency
0–5	8
5–10	12
10–15	20
15–20	16
20–25	4

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11. Find the median of the following data :

Class Interval	Frequency
0–20	8
20–40	10
40–60	12
60–80	9
80–100	9

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12. Draw a histogram of the following data on a graph paper and estimate the mode .

Percentage of Marks	Number of Students
0–20	10
20–40	12
40–60	16
60–80	14
80–100	8

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13. Find the coefficient of variation of the following dice creates series .

Scores	Frequency
1	5
2	4
3	3
4	2
5	1

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Easy Type Questions

1. If the mean of the following table is 30 , then find the missing frequencies .

Class Interval	Frequency
0–15	10
15–30	a
30–45	b
45–60	8
Total	60

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2. Calculate the AM of the following data using short-cut method .

Marks	Number of Students
0–10	3
10–20	4
20–30	6
30–40	8
40–50	9

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3. Find the standard deviation of the following discrete series .

Scores	Frequency
1	0
2	4
3	3
4	2
5	1

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4. Find the variance and SD for the given frequency distribution .

Class Interval	Frequency
1–5	4
6–10	1
11–15	2
16–20	3

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Level 1

1. If the arithmetic mean of the first n natural numbers is 15 , then n is _____ .

A. 15

B. 30

C. 14

D. 29

Answer: d

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2. If the arithmetic mean of 7 , 8 , x , 11 , 14 is x , then x is _____.

A. 9

B. 9.5

C. 10

D. 10.5

Answer: c

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3. Find the mode of the data , 5 , 3, 4, 3, 5 , 3 , 6 , 4 , 5 .

A. 5

B. 4

C. 3

D. Both (a) and (c)

Answer: d

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4. The median of the data 5 , 6 , 7, 8 , 9 , 10 is

_____.

A. 7

B. 8

C. 7.5

D. 8.5

Answer: c

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5. If a mode exceeds a mean by 12 , then the mode exceeds the median by _____.

A. 4

B. 8

C. 6

D. 10

Answer: b

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6. If the less than cumulative frequency of a class is 50 and that of the previous class is 30 , then the frequency of that class is _____.

A. 10

B. 20

C. 40

D. 30

Answer: b

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7. If the median of the data , $x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8$ is a , then find the median of the data is x_3, x_4, x_5, x_6. (where $x_1 < x_2 < x_3 < x_4 < x_5 < x_6 < x_7 < x_8$)

A. a

B. $\frac{a}{2}$

C. $\frac{a}{4}$

D. $\frac{a}{5}$

Answer: a

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8. The mode of the data 6 , 4 , 3 , 6 , 4 , 3 , 4 , 6 , 5 and x can be :

A. Only 5

B. Both 4 and 6

C. Both 3 and 6

D. 3 , 4 or 6

Answer: d

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9. If the greater than cumulative frequency of a class is 60 and that of the next class is 40 , then find the frequency of that class .

A. 10

B. 20

C. 50

D. 30

Answer: b

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10. If the difference between the mode and median is 2 , the difference between the median and mean is _____ (in the given order) .

A. 2

B. 4

C. 1

D. 0

Answer: c

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11. In a series of observations , SD is 7 and mean is 28 .

Find the coefficient of variation .

A. 4

B. $\frac{1}{4}$

C. 25

D. 12.5

Answer: c

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12. If the SD of $x_1, x_2, x_3, \ldots, x_n$ is 5 , then find SD of $x_1 + 5, x_2 + 5, x_3 + 5, \ldots, x_n + 5$.

A. 0

B. 10

C. 5

D. 2

Answer: c

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13. In a series of observations , coefficient of variation is 16 and mean is 25 . Find the variance .

A. 4

B. 8

C. 12

D. 16

Answer: d

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14. If the SD of $y_1, y_2, y_3 \ldots y_n$ is 6 , then variance of $(y_1 - 3), (y_2 - 3), \ldots, (y_n - 3)$ is _____.

A. 6

B. 36

C. 3

D. 27

Answer: b

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15. Lower quartile , upper quartile and interquartile range are Q_1, Q_3 and Q . If the average of Q, Q_1 and Q_3 is 40 and semi-interquartile range is 6 , then find the lower quartile .

A. 24

B. 36

C. 48

D. 60

Answer: c

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16. The weights of 20 students in a class are given below.

Weight (in kg)	Number of Students
31	6
32	3
33	5
34	2
35	4

Find the median of the above frequency distribution .

A. 32.5

B. 33

C. 33.5

D. 32

Answer: b

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17. The weights of 20 students in a class are given below.

Weight (in kg)	Number of Students
31	6
32	3
33	5
34	2
35	4

The interquartile range of the above frequency distribution is _____.

A. 4

B. 3

C. 2

D. 1

Answer: b

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18. If the average of a , b , c and d is the average of b and c , then which of the following is necessarily true ?

A. $(a+d)=(b+c)$

B. $(a+b)=(c+d)$

C. $(a-d)-(b-c)$

D. $\frac{(a+b)}{4}$

Answer: a

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19. Find the interquartile range of the data 3 , 6 , 5 , 4, 2 , 1 and 7.

A. 4

B. 3

C. 2

D. 1

Answer: a

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20. If the mean of the lower quartile and upper quartile is 10 and the semi-interquartile range is 5 , then the lower quartile and the upper quartile are _____ and _____ .

A. 2 , 12

B. 3 , 13

C. 4 , 14

D. 5 , 15

Answer: d

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21. The lower quartile of the data 5 , 3, 4 , 6 , 7 , 11 , 9 is _____.

A. 4

B. 3

C. 5

D. 6

Answer: a

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22. Find the arithmetic mean of the first 567 natural numbers .

A. 284

B. 283.5

C. 283

D. 285

Answer: a

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23. If $a < b < c < d$ and a , b , c , d are non-zero integers , the mean and median of a , b , c

, d is 0 , then which of the following is correct

?

A. $b = -c$

B. $a = -d$

C. Both (a) and (b)

D. None of these

Answer: c

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24. The mean of 16 observations is 16 . If one observation 16 is deleted and three observations 5 , 5 and 6 are included , then find the mean of the final observations .

A. 16

B. 15.5

C. 13.5

D. None of these

Answer: d

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25. If L = 44.5 , N = 50 , F = 15 , f = 5 and C = 20 , then find the median from of given data .

A. 84.5

B. 74.5

C. 64.5

D. 54.5

Answer: a

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26. If L = 39.5 , $\Delta_1 = 6, \Delta_2 = 9$ and c = 10 , then find the mode of the data .

A. 45.5

B. 43.5

C. 46.5

D. 44.5

Answer: b

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27. The average weight of 55 students is 55 kg , and the average weight of another 45 students is 45 kg .

Find the average weight of all the students .

A. 48 kg

B. 50 kg

C. 50.5 kg

D. 52.25 kg

Answer: c

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28. If the mean of 26 , 19 , 15 , 24 , and x is x , then find the median of the data .

A. 23

B. 22

C. 20

D. 21

Answer: d

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Level 2

1. The mean and median of the data a, b and c are 50 and 35 , where $a < b < c$. If $c - a = 55$, then find (b - a) .

A. 8

B. 7

C. 3

D. 5

Answer: D

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2. If $a < b < 2a$, and the mean and the median of a , b and 2a are 15 and 12 , then find a .

A. 7

B. 11

C. 10

D. 8

Answer: b

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3. The variance of $6x_i + 3$ is 30 , find the standard deviation of x_i .

A. $\frac{5}{\sqrt{6}}$

B. $\sqrt{\frac{5}{6}}$

C. 30

D. $\sqrt{30}$

Answer: b

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4. The frequency distribution of the marks obtained by 28 students in a test carrying 40 marks is given below :

Marks	Number of Students
0–10	6
10–20	x
20–30	y
30–40	6

If the mean of the above data is 20 , then find the difference between x and y .

A. 3

B. 2

C. 1

D. 0

Answer: d

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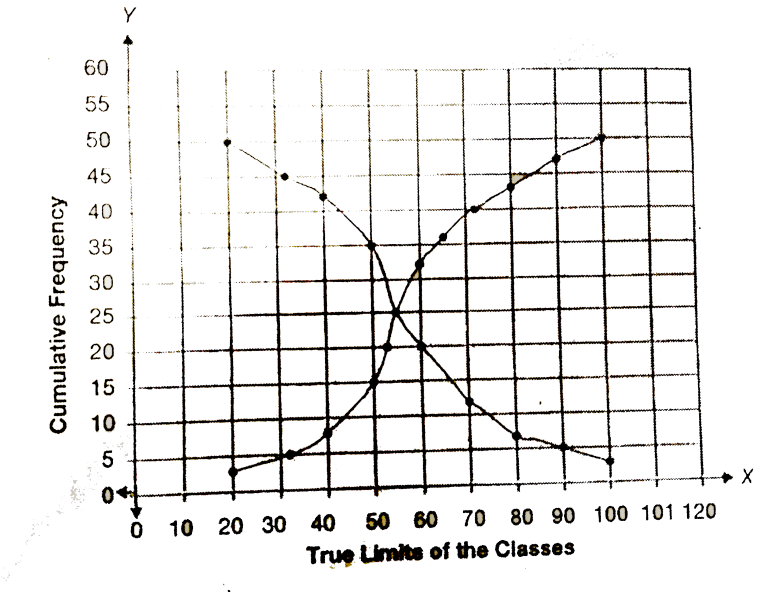
5. Find the number of students who scored less than or equal 50% of marks .



A. 35

B. 15

C. 20

D. 30

Answer: b

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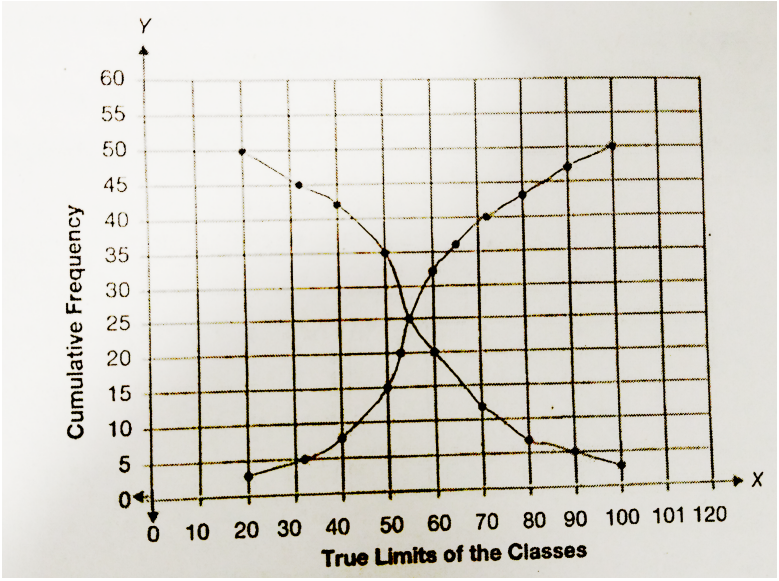
6. Find the number of students who scored greater than or equal to 90% of marks .



A. 47

B. 45

C. 5

D. 10

Answer: c

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7. Find the variance of the scores 2 , 4 , 6 , 8 and 10 .

A. 2

B. 4

C. 6

D. 8

Answer: d

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8. If A = 55.5 , N = 100 , C = 20 , and $\sum f_i d_i = 60$, then find the mean from the given data .

A. 67.5

B. 57.5

C. 77.5

D. 47.5

Answer: a

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9. Mode for the following distribution is 17.5 and x is less than 6 . Find x .

Class Interval	Frequency
0–5	5
5–10	2
10–15	3
15–20	6
20–25	x

A. 3

B. 2

C. 4

D. 5

Answer: a

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10.

Class Interval	Frequency
0–6	2
6–12	4
12–18	6

Find the coefficient of variation for the given distribution .

A. $\frac{200\sqrt{6}}{11}$

B. $\frac{200\sqrt{3}}{11}$

C. $\frac{500}{11}$

D. $\frac{200\sqrt{5}}{11}$

Answer: d

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11.

Class Interval	Frequency
0–6	2
6–12	4
12–18	6

Find the variance for the given distribution :

A. 24

B. 12

C. 20

D. 25

Answer: c

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12. Find the mean of the quartiles Q_1, Q_2 and Q_3 of the data 5 , 9 , 8 , 12 , 7 , 13 , 10 , 14.

A. 9

B. 10

C. 9.5

D. 11.5

Answer: c

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13. Which of the following cannot be determined ?

(A) Range of the factors of 64

(B) Range of the first 10 positive integers

A. A

B. B

C. Both (A) and (B)

D. None of these

Answer: d

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14. Find the mean of the following data .

Range of first n natural numbers , range of negative integers from - n to -1 (where $-n < -1$) , range of first n positive even

integers and range of first n positive odd integers .

A. $\frac{3}{2}(n-1)$

B. $\frac{3n-2}{2}$

C. $\frac{3}{2}(n-2)$

D. $\frac{4n-3}{2}$

Answer: a

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15. The following are the steps involved in finding the mean of the data .

x	f
10	1
8	3
6	5
4	7
2	9

(A) $\therefore$ Mean = $\dfrac{\sum fx}{\sum f} = \dfrac{110}{25}$

(B) $\sum fx = 10 + 24 + 30 + 28 + 18$

$\sum f = 1 + 3 + 5 + 7 + 9$

(C) $\therefore$ Mean = 4.4

(D) $\sum fx = 110$ and $\sum f = 25$

A. ABDC

B. ACBD

C. BDAC

D. BCAD

Answer: c

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16. The mean weight of a group of 9 students is 19 kg . If a body of weight 29 kg is joined in the group , then find the mean weight of 10

students.

The following are the steps involved in solving the above problem . Arrange them in sequential order .

(A) The mean weight of 10 students = $\frac{200}{10}$ kg

(B) The total weight of 9 students = 9×19 kg

= 171 kg

(C) The total weight of 10 students = (171 + 29) kg = 200 kg

(D) $\therefore$ The mean weight = 20 kg

A. BCAD

B. BDAC

C. BDCA

D. BCDA

Answer: a

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Level 3

1. The arithemetic mean of the following data is 7 . Find (a +b) .

x	f
4	a
6	4
7	b
9	5

A. 4

B. 2

C. 3

D. Cannot be determined

Answer: d

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2. The performance of four students in annual report is given below .

Name of Student	Mean Score ($\bar{x}$)	SD (σ)
Dheeraja	75	11.25
Nishitha	65	5.98
Sindhuja	48	8.88
Akshitha	44	5.28

Who is more consistent than the others ?

A. Dheeraja

B. Nishitha

C. Sindhuja

D. Akshitha

Answer: b

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3. The performance of four students in annual report is given below .

Name of Student	Mean Score ($\bar{x}$)	SD (σ)
Dheeraja	75	11.25
Nishitha	65	5.98
Sindhuja	48	8.88
Akshitha	44	5.28

Who is less consistent than the others ?

A. Dheeraja

B. Nishitha

C. Sindhuja

D. Akshitha

Answer: c

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4. If the mean of the squares of first n natural numbers is 105 , then find the median of the first n natural numbers .

A. 8

B. 9

C. 10

D. 11

Answer: b

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5. Range of the scores 18 , 13 , 14 , 42 , 22 , 26 and x is 44 $(x > 0)$. Find the sum of the digits of x .

A. 16

B. 14

C. 12

D. 18

Answer: c

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6. Find the arithmetic mean of the series $1, 3, 5, \ldots, (2n-1)$.

A. $\frac{2n-1}{n}$

B. $\frac{2n+1}{n}$

C. n

D. n + 2

Answer: c

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7. The arithemetic mean of the squares of first n natural numbers is _____.

A. $\frac{(n+1)(2n+1)}{6}$

B. $\frac{n+1}{6}$

C. $\frac{n^2-1}{6}$

D. $\frac{n-1}{6}$

Answer: a

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8. If X , M , Z are denoting mean , median and mode of a data and X : M = 9 : 8 , then find the ratio M : Z .

A. $8:9$

B. $4:3$

C. $7:6$

D. $5:4$

Answer: b

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9. The arithmetic mean of the series $1, 3, 3^2, \ldots, 3^{n-1}$ is _____.

A. $\frac{3^n}{2n}$

B. $\frac{3^n - 1}{2n}$

C. $\frac{3^{n-1}}{n+1}$

D. $\frac{3^n + 1}{2n}$

Answer: b

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10. The mean of the data x , x + a , x+ 2a , x + 3a , ..., (2n +1 terms) is _____.

A. x + (n -1) a

B. x + (n + 1) a

C. x + (n + 2) a

D. x + an

Answer: d

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11. The mean height of 25 boys in a class is 150 cm , and the mean height of 35 girls in the same class is 145 cm . The combined mean

height of 60 students in the class is _____ (approximately).

A. 143.06 cm

B. 146.08 cm

C. 147.08 cm

D. 145.09 cm

Answer: C

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12. The sum of 15 observations of a data is (434 + x) . If the mean of the data is x , then find x.

A. 25

B. 27

C. 31

D. 33

Answer: c

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13. The mean weight of 9 students is 25 kg . If one more student is joined in the group the mean is unaltered , then the weight of the 10th student is _____ (in kg) .

A. 25

B. 24

C. 26

D. 23

Answer: A

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14. Observation of some data are $\frac{x}{5}, x, \frac{x}{3}, \frac{2x}{3}, \frac{x}{4}, \frac{2x}{5}$ and $\frac{3x}{4}$ where $x > 0$. If the median of the data is 4, then find the value of 'x'.

A. 5

B. 7

C. 8

D. 10

Answer: D

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