



# MATHS

# **BOOKS - CENGAGE MATHS (ENGLISH)**

# **STATISTICS**



**1.** If a variate x is expressed as a linear function of two variates u and v in the form x = au + bv, then mean  $\bar{x}$  of x is

A. a) 
$$a\overline{U}-b\overline{V}$$

B. b)  $\overline{U}+\overline{V}$ 

C. c)  $b\overline{U}+a\overline{V}$ 

D. d) None of these

#### Answer: D

**Watch Video Solution** 

2. If the mean of the numbers 27 + x, 31 + x, 89 + x, 107 + x, 156 + x is 82, then the mean of 130 + x, 126 + x, 68 + x, 50 + x, 1 + x is

A. 75

B. 157

C. 82

D. 80

**Answer: A** 

Watch Video Solution

**3.** If the arithmetic mean of the numbers  $x_1, x_2, x_3, ..., x_n$ is  $\bar{x}$ , then the arithmetic mean of the numbers  $ax_1 + b, ax_2 + b, ax_3 + b, ..., ax_n + b$ , where a, b are two constants, would be

A.  $ar{x}$ 

B.  $naar{x} + nb$ 

C.  $a\bar{x}$ 

D.  $aar{x}+b$ 

#### Answer: D



**4.** The weighted means of of first n natural numbers whose weights are equal to the squares of corresponding numbers is

A. 
$$\frac{n+1}{2}$$
  
B.  $\frac{3n(n+1)}{2(2n+1)}$   
C.  $\frac{(n+1)(2n+1)}{6}$   
D.  $\frac{n(n+1)}{2}$ 



5. A student obtain 75%, 80% and 85% in three subjects if the marks of another subject are added. Then the average cannot be less than

A. 0.6

B. 0.65

C. 0.8

D. 0.9



6. If  $\overline{x_1}$  and  $\overline{x_2}$  are the means of two distributions such that  $\overline{x_1} < \overline{x_2}$  and  $\overline{x}$  is the mean of the combined distribution, then

A. 
$$ar{x} < \overline{x_1}$$
  
B.  $ar{x} > \overline{x_2}$   
C.  $ar{x} = rac{\overline{x_1} + \overline{x_2}}{2}$   
D.  $\overline{x_1} < ar{x} < \overline{x_2}$ 

#### Answer: D



7. Mean of 100 items is 49. It was discovered that three items which should have been 60, 70, 80 were wrongly read as 40, 20, 50 respectively. The correct mean is. (a) 48 (b)  $82\frac{1}{2}$  (c) 50 (d) 80

A. 48

B. 82.5

C. 50

D. 80

Answer: C



8. The mean weight per student in a group of 7 students
is 55 kg. The individual weights of 6 of them (in kg) are 52,
54, 53, 56 and 54. Find the weight of the seventh student.

A. 55 kg

B. 60 kg

C. 57 kg

D. 50 kg

Answer: C



9. If a variable takes the discrete values lpha+4,

$$lpha-rac{7}{2},lpha-rac{5}{2},lpha-2,lpha-3,lpha+rac{1}{2},lpha-rac{1}{2},lpha+5(lpha>0)$$

, then the median is

A. 
$$lpha - rac{5}{4}$$
  
B.  $lpha - rac{1}{2}$   
C.  $lpha - 2$   
D.  $lpha + rac{5}{4}$ 



**10.** The median of a set of nine distinct observations is 20.5. If each of the last four observations of the set is increased by 2, then the median of the new set is

A. Is increased by 2

B. In decreased by 2

C. Is two times the original median

D. Remains the same as that of the original set

Answer: D



**11.** If in a moderately asymmetrical distribution the mode and the mean of the data are  $6\lambda$  and  $9\lambda$ , respectively, then the median is

A.  $8\lambda$ 

 $\mathrm{B.}\,7\lambda$ 

 ${\rm C.}\,6\lambda$ 

D.  $5\lambda$ 



12. The mean deviation about the mean of the following

distribution is

Size2021222324Frequency64514

A. 1

B. 1.25

C. 1.5

D. 1.75

**Answer: B** 



13. The mean deviation about the median of the following

distribution is

Marks obtained	10	11	12	14	15
Number of students	2	3	8	3	4

Watch Video Solution

### 14. about to only mathematics

A. 
$$\frac{n^2 - 1}{12}$$
  
B.  $\frac{n^2 - 1}{6}$   
C.  $\frac{n^2 + 1}{6}$   
D.  $\frac{n^2 + 1}{12}$ 



**15.** The mean of five observations is 4 and their variance is 5.2. If three of these observations are 1,2 and 6, then the other two are

A. 2 and 9

B. 3 and 8

C. 4 and 7

D. 5 and 6

Answer: C



16. The standard deviation of data 6,5,9,13,12,8 and 10 is

A. 
$$\sqrt{\frac{52}{7}}$$
  
B.  $\frac{52}{7}$   
C.  $\sqrt{6}$ 

 $\mathsf{D.}\,6$ 

#### Answer: A



17. Consider the frequency distribution, where A is a

positive interger : variance is 160.

x	A	2A	3A	4A	5A	6A
f	2	1	1	1	1	1



18. Find The standard deviation of the following frequency distribution is  $X \ 2 \ 3 \ 4 \ 5 \ 6 \ 7$ f 4 9 16 14 11 6 A. 1.38 B. 1.42 C. 1.45 D. 1.60

#### Answer: A

Watch Video Solution

**19.** Let a, b, c, d, e, be the observations with m and standard deviation s. The standard deviation of the observations a+k, b+k, c+k, d+k, e+k is (a) s (b) ks (c) s + k (d)  $\frac{s}{k}$ 

A. s

B. ks

C. s+k

D. 
$$\frac{s}{k}$$





**1.** In a class of 100 students, there are 70 boys whose average marks in a subject is 75. If the average marks of the complete class is 72, then what is the average of the girls ?

- A. 73
- B. 65
- C. 68
- D. 74

Answer: B



2. The median of a set of nine distinct observations is 20.5.If each of the last four observations of the set is increasedby 2, then the median of the new set is

A. Is increased by 2

B. In decreased by 2

C. Is two times the original median

D. Remains the same as that of the original set

Answer: D



3. If in a frequency distribution, the mean and median are

21 and 22 respectively, then its mode is approximately.

A. 22.0

B.20.5

 $\mathsf{C.}\,25.5$ 

D.24.0

Answer: D

Watch Video Solution

**4.** The average marks of boys in a class is 52 and that of girls is 42. The average marks of boys and girls combined

is 50. The percentage of boys in the class is

A. 40

B. 20

C. 80

D. 60

### Answer: C

Watch Video Solution

## 5. Compute the median from the following table

Marks obtained	No. of students		
0 10	2		
10-20	18		
20 30	30		
30 40	45		
40 - 50	35		
<b>50</b> -60	20		
6070	6		
7080	3		

A. 36.55

B.35.55

C.40.05

D. None of these

### Answer: A

Watch Video Solution

1. In an experiment with 15 observations of x the following results were available  $\sum x^2 = 2830$ ,  $\sum x = 170$  one observation that was 20 was found to be wrong and it was replaced by its correct value of 30. Then the corrected variance is

A.78.00

B. 188.66

C. 177.33

D. 8.33



**2.** In a series of 2n observations, half of them equal a end remaining half equal -a. If the S.D. of the observations is 2, then |a| equals

A. 
$$\frac{1}{n}$$
  
B.  $\sqrt{2}$ 

D. 
$$\frac{\sqrt{2}}{n}$$

#### Answer: C



A. 1

B. 9/4

C.4/9

D. 2/3



**4.** 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

#### Answer: D



5. Let  $x_1, x_2, x_3, x_4, x_5$  be the observations with mean m

and standard deviation s. The standard deviation of the

observations  $kx_1, kx_2, kx_3, kx_4, kx_5$  is

A. k+s

$$\mathsf{B}.\,\frac{s}{k}$$

C. ks

D. s

#### Answer: C

# Watch Video Solution

6. Let  $1x_1, x_2, \ldots x_n$  be n obervations .Let  $w_i = lx_i + k$  for  $i = 1, 2, \ldots n$ , where I and k are constants. If the mean of  $x_i$  is 48 and their standard

deviation is 12 the mean of  $w_i$  's is 55 and standard deviation of  $w_i$  is 15 then the value of I and k should be

A. I=2.5, k=5

B. I=-1.25, k=5

C. I=2.5, k=-5

D. I=1.25, k=-5

#### Answer: D



Exercises

**1.** Coefficients of variation of two distributions are 50 and 60, and their arithmetic means are 30 and 25, respectively. Difference of their standard deviations is

- a. 0 b. 1 c. 1.5 d. 2.5
  - A. 0
  - B. 1
  - C. 1.5
  - D. 2.5



**2.** The mean of a set of numbers is  $\overline{X}$ . If each number is divided by 3, then the new mean is

A.  $\overline{X}$ B.  $\overline{X}+3$ C.  $3\overline{X}$ 

D. 
$$\frac{\overline{X}}{3}$$

Answer: D



**3.** The A.M. of the series  $1, 2, 4, 8, 16, \ldots, 2^n$  is -

A. 
$$\frac{2^{n}-1}{n}$$
  
B.  $\frac{2^{n+1}-1}{n+1}$   
C.  $\frac{2^{n}+1}{n}$   
D.  $\frac{2^{n}-1}{n+1}$ 

#### Answer: B



# **4.** The mean of n items is $\overline{X}$ . If the first item is increased

by 1, second by 2 and so on, then the new mean is

A. 
$$\overline{X} + n$$

$$\mathsf{B}.\,\overline{X}+\frac{n}{2}$$

$$\mathsf{C}.\,\overline{X}+\frac{n+1}{2}$$

D. None of these

Answer: C

Watch Video Solution

**5.** For a slightly asymmetric distribution, mean and medain are 5 and 6, respectively. What is its mode ?

A. 8

B. 11

C. 6

D. None of these

### Answer: A



**6.** For a normal distribution if the mean is M, mode is  $M_0$ and median is  $M_d$ , then

- A.  $M>M_d>M_0$
- B.  $M < M_d < M_0$
- $\mathsf{C}.\,M=M_dM_0$
- $\mathsf{D}.\,M=M_d=M_0$

#### Answer: D



7. The following data give the distribution of heights of

students :

Height (in cm)	160	150	152	161	156	154	155
$\mathop{\rm Numbers}_{\rm students} {\rm of}$	12	8	4	4	3	3	7

The median of the distribution is

A. 154

B. 155

C. 160

D. 161

**Answer: B** 

Watch Video Solution

**8.** An automobile driver travels from a plain to a hill station 120 km away at an average speed of 30 km per hour. He then makes the return trip at an average speed 25 km per hour. He covers another 120 km on the plain at an average speed of 50 km per hour. His average speed (in km/hr) over the entire distance of 360 km will be



D. None of these

### Answer: C



9. The mean deviation of the data 3,10,10,4,7,10,5 from the

mean is

A. 2

B. 2.57

C. 3

D. 3.75

Answer: B

Watch Video Solution

10. when tested the lives (in hours) of 5 bulbs were noted

as follows 1357,1090,1666,1494,1623
The mean deviations (in hours ) from their mean is

A. 178

B. 179

C. 220

D. 356

## Answer: A



**11.** Following are the marks obtained by 9 student in a

mathematics test

50,69,20,33,53,39,40,65,59,

The mean deviation from the median is

A. 9

B. 10.5

C. 12.67

D. 14.76

Answer: C

Watch Video Solution

12. If the mean of the distribution is 2.6, then the value of

y is

Variate x12345Frequency f of x45y12

A. 24

B. 13

C. 8

D. 3

Answer: C



13. If the mean of the set of numbers  $x_1, x_2, x_3, ..., x_n$  is

 $ar{x}, ext{ then the mean of the numbers } x_i+2i, 1\leq i\leq n$  is

A.  $ar{x}+2n$ 

 $\mathsf{B}.\,\bar{x}+n+1$ 

 $\mathsf{C}.\,\bar{x}+2$ 

 $\mathsf{D}.\,\bar{x}+n$ 

### Answer: B



14. The harmonic mean of 4,8,16 is

A. 6.4

B. 6.7

C. 6.85

D. 7.8

Answer: C



**15.** The average of n numbers  $x_1, x_2, x_3, \ldots, x_n$  is M. If  $x_n$  is replaced by x', then new average is

A. 
$$M-x_n+x$$
'  
B.  $\displaystyle \frac{nM-x_n+x'}{n}$   
C.  $\displaystyle \frac{(n-1)M+x'}{n}$   
D.  $\displaystyle \frac{M-x_n+x'}{n}$ 

#### **Answer: B**



16. The following data gives the distribution of height of

students :

Height (in cm)	160	150	152	161	156	154	155
$\mathop{\rm Numbers}_{\rm students} {\rm of}$	12	8	4	4	3	3	7

The median of the distribution is

A. 154

B. 155

C. 160

D. 161

**Answer: B** 

Watch Video Solution

**17.** For a slightly asymmetric distribution, mean and medain are 5 and 6, respectively. What is its mode ?

A. 5

B. 6

C. 7

D. 8

Answer: D

**Watch Video Solution** 

18. Runs scored by a batsman in 10 innings are : 38,

70,48,34,42,55,63,46,54,44

The mean deviation about median is

A. 8.6

B. 6.4

C. 10.6

D. 9.6

Answer: A



19. If  $\mu$  the mean of distribution  $(y_i, f_i)$ , then $\sum f_i(y_i-\mu)$ =

A. M.D.

B. S.D.

C. 0

D. Relative frequency

## Answer: C

Watch Video Solution

**20.** The range of the following set of observations 2, 3, 5, 9, 8, 7, 6, 5, 7, 4, 3 is

A. 11

B. 7

C. 5.5

D. 6



**21.** If each observation of a raw data whose variance is  $\sigma$  is multiplied by h, then the variance of the new set is

A.  $\sigma^2$ 

 $\mathrm{B.}\,h^2\sigma^2$ 

 $\mathrm{C.}\,h\sigma^2$ 

D.  $h+\sigma^2$ 

Answer: B



**22.** The freezing point of nitrobenzene is  $3^{\circ}C$ . When 1.2 g of chloroform (mol. Wt. =120) is dissolved in 100 g of nitrobenzene, freezing point will be  $2.3^{\circ}C$ . When 0.6 g of acetic acid is dissolved in 100 g of nitrobenzene, freezing point of solution is  $2.64^{\circ}C$ . If the formula of acetic acid is  $(CH_2O)_n$ , find the value of n.

A. 
$$\frac{n^2 - 1}{12}$$
  
B.  $\frac{n}{2}$   
C.  $\frac{n}{4}$ 

D. None of these

### Answer: C



23. Variance of the data 2,4,6,8,10 is

A. 6

B. 7

C. 8

D. None of these

## Answer: C

Watch Video Solution

**24.** If the standard deviation of 0, 1, 2, 3...9 is K, then the standard deviation of 10, 11, 12, 13....19 is

A. K

B. K+10

 $\mathsf{C}.\,K+\sqrt{10}$ 

D. 10 K

Answer: A

Watch Video Solution

**25.** For a given distribution of marks, the mean is 35.16 and its standard deviation is 19.76. The coefficient of variation is

A.  $\frac{35.16}{19.76}$ 

B. 
$$\frac{19.76}{35.16}$$
  
C.  $\frac{35.16}{19.76} \times 100$   
D.  $\frac{19.76}{35.16} \times 100$ 

## Answer: D



**26.** The mean and S.D of 1, 2, 3, 4, 5, 6 is

A. 
$$\frac{7}{2}, \sqrt{\frac{35}{2}}$$
  
B. 3, 3  
C.  $\frac{7}{2}, \sqrt{3}$   
D. 3,  $\frac{35}{12}$ 



**27.** The standard deviation of 25 numbers is 40. If each of the numbers in increased by 5, then the new standard deviation will be -

A. 40

B.45

C. 
$$40 + \frac{21}{25}$$

D. None of these

### Answer: A



28. Consider any set of observations  $x_1, x_2, x_3, \ldots, x_{101}$ . It is given that  $x_1 < x_2 < x_3 < \ldots Ltx_{100} < x_{101}$ , then the mean deviation of this set of observations about a point k is minimum when k equals



B.  $x_{51}$ 

C.  $\frac{x_1 + x_2 + \ldots + x_{101}}{101}$ 

D.  $x_{50}$ 

### Answer: B



**29.** For (2n+1) observations  $x_1, x_2, -x_2, \ldots, x_n, -x_n$ and 0, where all x's are distinct, let SD and MD denote the standard deviation and median, respectively. Then which of the following is always true ?

A. SD < MD

 $\mathsf{B.}\,SD > MD$ 

C. SD=MD

D. Nothing can be said in general about the

relationship between SD and MD

#### Answer: B



**30.** If  $\bar{x}$  is the mean of n observations  $x_1, x_2, x_3, \ldots, x_n$ ,

then the value of  $\sum_{i=1}^n \left(x_i - ar{x}
ight)$  is (i) -1 (ii) 0 (iii) 1 (iv) n-1

A. 
$$S \leq r\sqrt{rac{n}{n-1}}$$
  
B.  $S = r\sqrt{rac{n}{n-1}}$   
C.  $S \geq r\sqrt{rac{n}{n-1}}$ 

D. None of these

#### Answer: A

**31.** If the standard deviation of a variable  $\xi s\sigma$ , then standard deviation of variable  $\frac{aX+b}{c}$  is  $a\sigma$  (b)  $\frac{a}{c}\sigma$  (c)

$$\left|rac{a}{c}
ight|\sigma$$
 (d)  $rac{a\sigma+b}{c}$ 

A. 
$$\left(\frac{a}{c}\right)\sigma$$
  
B.  $\left|\frac{a}{c}\right|\sigma$   
C.  $\left(\frac{a^2}{c^2}\right)\sigma$ 

D. None of these

### Answer: B



32. The standard deviation of data 6,5,9,13,12,8 and 10 is

A. 
$$\sqrt{\frac{52}{7}}$$
  
B.  $\frac{52}{7}$ 

C.  $\sqrt{6}$ 

D. 6

Answer: A

**Watch Video Solution** 

**33.** If the mean of 100 observations is 50 and their standard deviations is 5,than the sum of all squares of all the observations is

A. 50000

B. 250000

C. 252500

D. 255000

# Answer: C



# 34. The standard deviation of first 10 natural numbers is

- a) 8.25
- (b) 6.5
- (c) 3.87
- (d) 2.87

A. 5.5

B. 3.87

C. 2.97

D. 2.87

## Answer: D



**35.** Consider the numbers 1,2,3,4,5,6,7,8,9,10. If 1 is added to

each number, the variance of the numbers so obtained is

A. 6.5

B. 2.87

C. 3.87

D. 8.25

Answer: D



**36.** Consider the first 10 positve integers .If we multiply each number by -1 and then add 1 to each number, the variance of the number so obtained

A. 8.25

B. 6.5

C. 3.87

D. 2.87

Answer: A



<b>37.</b> If for a sample of size 60, we have the following
information $\sum \xi^2 = 18000 and \sum \xi = 960$ , then the
variance is
a)6.63
(b) 16
(c) 22
(d) 44
A. 6.63
B. 16
C. 22
D. 44

Answer: D

**Watch Video Solution** 

**38.** The standard deviation of some temperature data in .° C is 5 .If the data were converted into .° F then variance would be

A. 81

B. 57

C. 36

D. 25

Answer: A



**39.** What is the standard deviation of the following data ? Measurement 0 - 10 10 - 20 20 - 30 30 - 40Frequency 1 3 4 2 (a) 81 (b) 7.6 (c) 9 (d) 2.26

A. 81

B. 7.6

C. 9

D. 2.26

Answer: C





1. If the mean deviation of the numbers 1, 1 + d, 1 + 2d, ..., 1 + 100d from their mean is 25, then the d is equal to (1) 10.0 (2) 20.0

- (3) 10.1
- (4) 20.2
  - A. 10.0
  - $B.\,20.0$
  - C. 10.1

D. 20.2

# Answer: C



2. In a binomial distribution 
$$B\left(n, p = \frac{1}{4}\right)$$
, if the probability of at least one success is greater than or equal to  $\frac{9}{10}$ , then n is greater than (1)  $\frac{1}{(\log)_{10}^4 - (\log)_{10}^3}$   
(2)  $\frac{1}{(\log)_{10}^4 + (\log)_{10}^3}$   
(3)  $\frac{9}{(\log)_{10}^4 - (\log)_{10}^3}$   
(4)  $\frac{4}{(\log)_{10}^4 - (\log)_{10}^3}$   
A.  $\frac{1}{\log_{10}4 - \log_{10}3}$   
B.  $\frac{1}{\log_{10}4 + \log_{10}3}$   
C.  $\frac{9}{\log_{10}4 - \log_{10}3}$ 

D. 
$$\frac{1}{\log_{10}4 - \log_{10}3}$$

## Answer: A



**3.** For two data sets, each of size 5, the variances are given to be 4 and 5 and the corresponding means are given to be 2 and 4, respectively. The variance of the combined data set is

(1) 
$$\frac{11}{2}$$
  
(2) 2  
(3)  $\frac{13}{2}$   
(4)  $\frac{5}{2}$ 

A. 
$$\frac{13}{2}$$
  
B.  $\frac{5}{2}$ 

C. 
$$\frac{11}{2}$$

D. 6

Answer: C

**Vatch Video Solution** 

4. If the mean deviation about the median of the numbers

a, 2a, ...., 50a is 50, then |a| equals :

(1) 2

(2) 3

(3) 4

(4) 5

B. 2

C. 3

D. 4

## Answer: D

Watch Video Solution

**5.** Let  $x_1, x_2, \ldots, x_n$  be n observations, and let  $\bar{x}$  be their arithematic mean and  $\sigma^2$  be their variance. Statement 1: Variance of  $2x_1, 2x_2, \ldots, 2x_n i s 4 \sigma^2$ . Statement 2: Arithmetic mean of  $2x_1, 2x_2, \ldots, 2x_n i s 4 \sigma^2$ . statement 2 is true (2) Statement 1 is true, statement 2 is true; statement 2 is a correct explanation for statement 1 (3) Statement 1 is true, statement 2 is true; statement 2 is not a correct explanation for statement 1 (4) Statement 1 is true, statement 2 is false

A. Statement 1 is false, statement 2 is true.

B. Statement 1 is true, statement 2 is true, statement 2

is a correct explanation for statement 1.

C. Statement 1 is true, statement 2 is true, statement 2

is not a correct explanation for statement 1.

D. Statement 1 is true, statement 2 is false.

Answer: D

Watch Video Solution

**6.** All the students of a class performed poorly in Mathematics. The teacher decided to give grace marks of 10 to each of the students. Which of the following statistical measures will not change even after the grace marks were given ? (1) median (2) mode (3) variance (4) mean

A. median

B. mode

C. variance

D. mean

#### Answer: c



7. The variance of first 50 even natural numbers is

- (1)  $\frac{833}{4}$
- (2) 833
- (3) 437
- (4)  $\frac{437}{4}$

A. 
$$\frac{833}{4}$$

- B.833
- C. 437

D. 
$$\frac{437}{4}$$

## Answer: B

Watch Video Solution

**8.** 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 :

- (1) 16.8
- (2) 16.0
- (3) 15.8
- (4) 14.0

A. 16.8

B. 16.0

C. 15.8

D. 14.0

# Answer: D





- 9. If the standard deviation of the numbers 2, 3, a and 11 is
- 3.5, then which of the following is true ?

(1) 
$$3a^2 - 26a + 55 = 0$$
  
(2)  $3a^2 - 32a + 84 = 0$   
(3)  $3a^2 - 34a + 91 = 0$   
(4)  $3a^2 - 23a + 44 = 0$   
A.  $3a^2 - 32a + 84 = 0$   
B.  $3a^2 - 34a + 91 = 0$   
C.  $3a^2 - 23a + 44 = 0$   
D.  $3a^2 - 26a + 55 = 0$
## Answer: A



10. If 
$$\sum_{i=1}^{9} (x_i - 5)$$
 and  $\sum_{i=1}^{9} (i = 1)^9 (x_i - 5)^2 = 45$ , then

the standard deviation of the 9 items  $x_1, x_2, \ldots, x_9$  is

- A. 3
- B. 9
- C. 4
- D. 2

Answer: D

