

TRIUMPH MHT-CET

Mathematics

6240
MULTIPLE CHOICE
QUESTIONS

Based on latest Syllabus of MHT-CET

Salient Features

- ☞ Includes chapters of Std. XII and relevant chapters of Std. XI as per latest MHT-CET Syllabus
- ☞ Exhaustive subtopic wise coverage of MCQs.
- ☞ '6240' MCQs including questions from various competitive exams.
- ☞ Chapter at a glance, Shortcuts provided in each chapter.
- ☞ Includes MHT-CET 2020 Question Paper and its solutions can be accessed through QR Code.
- ☞ Various competitive examination questions updated till the latest year.
- ☞ Evaluation test provided at the end of each chapter.
- ☞ Two Model Question Papers with answer keys and solutions provided in the form of QR Code.
- ☞ Question papers and Solutions of MHT-CET 2021 and 2022 are provided through QR Code.

Scan the adjacent QR code in *Quill - The Padhai App* to view Model Paper I and Solution.



Scan the adjacent QR code in *Quill - The Padhai App* to view Model Paper II and Solution.



Scan the adjacent QR code in *Quill - The Padhai App* to view Hints for relevant questions, Solution to Evaluation Test and MHT-CET paper 2020 in PDF format.



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PREFACE

“Don’t follow your dreams; chase them!” - a quote by Richard Dumbrill is perhaps the most pertinent for one who is aiming to crack entrance examinations held after std. XII. We are aware of an aggressive competition a student appearing for such career defining examinations experiences and hence wanted to create books that develop the necessary knowledge, tools and skills required to excel in these examinations.

For the syllabus of **MHT-CET**, 80% of the weightage is given to the syllabus for XIIth standard while only 20% is given to the syllabus for XIth standard (with inclusion of only selected chapters).

Although the syllabus for Std. XI and XII and MHT-CET is aligned, the outlook to study the subject should be altered based on the nature of the examination. To score in MHT-CET, a student has to be not just good with the concepts but also quick to complete the test successfully. Such ingenuity can be developed through sincere learning and dedicated practice.

Having thorough knowledge of mathematical concepts, formulae and their applications is a prerequisite for beginning with MCQs on a given chapter in Mathematics. Students must know the required rules, formulae, functions and general equations involved in the chapter. Mathematics requires understanding and application of basic concepts, so students should also be familiar with concepts studied in the earlier standards. They should befriend ideas like Mathematical logic, inverse functions, differential equations, integration and its applications and random variables to tackle the problems.

As a first step to MCQ solving, students should start with elementary questions. Once a momentum is gained, complex MCQs with higher level of difficulty should be practised. We have provided Question Papers and Solutions of MHT-CET 2020, 2021 and 2022.

Competitive exams challenge the understanding of students about the subject by combining concepts from different chapters in a single question. To figure these questions out, cognitive understanding of subject is required. Therefore, students should put in extra effort to practise such questions.

Promptness being virtue in these exams, students should wear time saving short tricks and alternate methods upon their sleeves and should be able to apply them with accuracy and precision as required.

Such a holistic preparation is the key to succeed in the examination!

To quote Dr. A.P.J. Abdul Kalam, *“If you want to shine like a sun, first burn like a sun.”*

Our **Triumph Mathematics** book has been designed to achieve the above objectives. Commencing from basic MCQs, the book proceeds to develop competence to solve complex MCQs. It offers ample practice of recent questions from various competitive examinations. While offering standard solutions in the form of concise hints, it also provides Shortcuts and Alternate Methods. Each chapter ends with an Evaluation test to allow self-assessment.

Features of the book presented on the next page will explicate more about the same!

We hope the book benefits the learner as we have envisioned.

- Publisher

Edition: First

The journey to create a complete book is strewn with triumphs, failures and near misses. If you think we’ve nearly missed something or want to applaud us for our triumphs, we’d love to hear from you.

Please write to us on: mail@targetpublications.org

FEATURES

Chapter at a glance

Chapter at a glance includes short and precise summary along with Tables and Key formulae in the chapter.

This is our attempt to make tools of formulae accessible at a glance for the students while solving problems.

Shortcuts to help students save time while dealing with questions.

This is our attempt to highlight content that would come handy while solving questions.

Shortcuts

Classical Thinking

Classical Thinking section encompasses straight forward questions including knowledge based questions.

This is our attempt to revise chapter in its basic form and warm up the students to deal with complex MCQs.

Critical Thinking section encompasses challenging questions which test understanding, rational thinking and application skills of the students.

This is our attempt to take the students from beginner to proficient level in smooth steps.

Critical Thinking

Competitive Thinking

Competitive Thinking section encompasses questions from various competitive examinations like MHT CET, JEE, etc.

This is our attempt to give the students practice of competitive questions and advance them to acquire knack essential to solve such questions.

Every section is **segregated sub-topic wise**.

This is our attempt to cater to individualistic pace and preferences of studying a chapter and enabling easy assimilation of questions based on the specific concept.

Subtopic wise segregation

Miscellaneous

Miscellaneous section incorporates MCQs whose solutions require knowledge of concepts covered in different sub-topics of the same chapter or from different chapters.

This is our attempt to develop cognitive thinking in the students which is essential to solve questions involving fusion of multiple key concepts.

Evaluation Test covers questions from chapter for self-evaluation purpose.

This is our attempt to provide the students with a practice test and help them assess their range of preparation of the chapter.

Evaluation test

QR Code

QR Code includes

- Question Papers and Solutions of MHT-CET 2021 and 2022.
- Model Papers I and II with Solutions
- Hints for relevant questions, Solutions to Evaluation Test and MHT-CET paper 2020.

MHT-CET PAPER PATTERN

- There will be three papers of Multiple Choice Questions (MCQs) in ‘Mathematics’, ‘Physics and Chemistry’ and ‘Biology’ of 100 marks each.
- Duration of each paper will be 90 minutes.
- Questions will be based on the syllabus prescribed by Maharashtra State Board of Secondary and Higher Secondary Education with approximately 20% weightage given to Std. XI and 80% weightage will be given to Std. XII curriculum.
- Difficulty level of questions will be at par with JEE (Main) for Mathematics, Physics, Chemistry and at par with NEET for Biology.
- There will be no negative marking.
- Questions will be mainly application based.
- Details of the papers are as given below:

Paper	Subject	Approximate No. of Multiple Choice Questions (MCQs) based on		Mark(s) Per Question	Total Marks
		Std. XI	Std. XII		
Paper I	Mathematics	10	40	2	100
Paper II	Physics	10	40	1	100
	Chemistry	10	40		
Paper III	Biology	20	80	1	100

- Questions will be set on
 - the entire syllabus of Std. XII of Physics, Chemistry, Mathematics and Biology subjects and
 - chapters / units from Std. XI curriculum as mentioned below:

Sr. No.	Subject	Chapters / Units of Std. XI
1	Physics	Motion in a plane, Laws of motion, Gravitation, Thermal properties of matter, Sound, Optics, Electrostatics, Semiconductors
2	Chemistry	Some Basic Concepts of Chemistry, Structure of Atom, Chemical Bonding, Redox Reactions, Elements of Group 1 and Group 2, States of Matter: Gaseous and Liquid States, Basic Principles and techniques of Chemistry, Adsorption and Colloids, Hydrocarbons
3	Mathematics	Trigonometry - II, Straight Line, Circle, Measures of Dispersion, Probability, Complex Numbers, Permutations and Combinations, Functions, Limits, Continuity
4	Biology	Biomolecules, Respiration and Energy Transfer, Human Nutrition, Excretion and osmoregulation

CONTENTS

Sr. No.	Textbook Chapter No.	Chapter Name	Page No.
Std. XI			
1	3	Trigonometry - II	1
2	5	Straight Line	25
3	6	Circle	48
4	8	Measures of Dispersion	63
5	9	Probability	70
6	1	Complex Numbers	93
7	3	Permutations and Combinations	117
8	6	Functions	132
9	7	Limits	148
10	8	Continuity	166
Std. XII			
11	1	Mathematical Logic	183
12	2	Matrices	200
13	3	Trigonometric Functions	214
14	4	Pair of Straight Lines	242
15	5	Vectors	255
16	6	Line and Plane	288
17	7	Linear Programming	320
18	1	Differentiation	338
19	2	Applications of Derivatives	366
20	3	Indefinite Integration	393
21	4	Definite Integration	434
22	5	Application of Definite Integration	457
23	6	Differential Equations	468
24	7	Probability Distribution	494
25	8	Binomial Distribution	505
26		MHT-CET 2020 Question Paper	513

Scan the adjacent QR Code in *Quill - The Padhai App* to view **Question Papers and Solutions of MHT-CET 2021 and 2022.**



Practicing model papers is the best way to self-assess your preparation for the exam Scan the adjacent QR Code to know more about our **"MHT-CET 20 Question Papers Set"** Book.



Disclaimer

This reference book is transformative work based on XIth std. textbook Mathematics; Second Reprint: 2021 and XIIth std. textbook Mathematics; First Reprint: 2021 published by the Maharashtra State Bureau of Textbook Production and Curriculum Research, Pune. We the publishers are making this reference book which constitutes as fair use of textual contents which are transformed by adding and elaborating, with a view to simplify the same to enable the students to understand, memorize and reproduce the same in examinations.

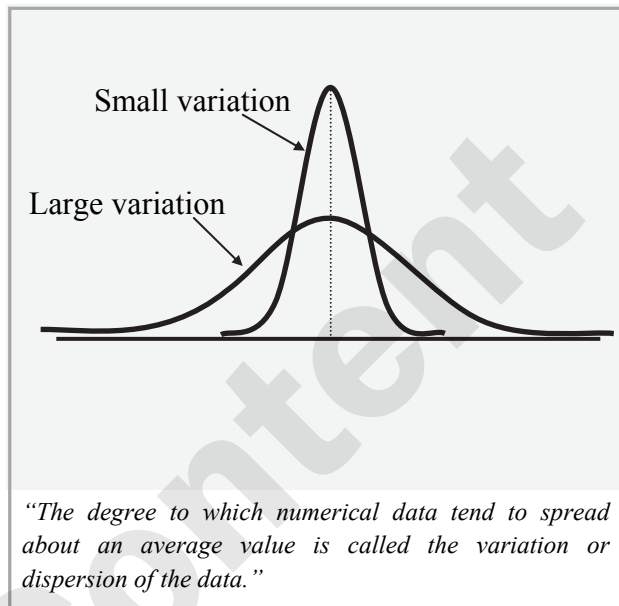
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Subtopics

- 8.1 Range, Variance and Standard Deviation
- 8.2 Standard Deviation for Combined data, Coefficient of variation



Chapter at a glance

1. **Range:**
R = Largest value of data
– Smallest value of data
= L – S
2. **Variance (σ^2) and Standard deviation (σ):**
 - i. **For Ungrouped data**
 - a. Variance (σ^2) = $\frac{1}{n} \sum_{i=1}^n (x_i - \bar{x})^2$ or
 $\frac{1}{n} \left(\sum_{i=1}^n x_i^2 \right) - (\bar{x})^2$
 - b. S.D. (σ) = $\sqrt{\frac{1}{n} \sum_{i=1}^n (x_i - \bar{x})^2}$
or $\sqrt{\frac{1}{n} \left(\sum_{i=1}^n x_i^2 \right) - (\bar{x})^2}$
 - ii. **For Grouped data**
 - a. Variance (σ^2) = $\frac{1}{N} \sum_{i=1}^n f_i (x_i - \bar{x})^2$
or $\frac{1}{N} \left(\sum_{i=1}^n f_i x_i^2 \right) - (\bar{x})^2$
 - b. S.D. (σ) = $\sqrt{\frac{1}{N} \sum_{i=1}^n f_i (x_i - \bar{x})^2}$
or $\sqrt{\frac{1}{N} \left(\sum_{i=1}^n f_i x_i^2 \right) - (\bar{x})^2}$

3. Change of Origin and Scale on S.D.:

$$\sigma_x = |h| \sigma_y$$

4. Standard deviation for Combined data:

$$\sigma^2 = \frac{n_1(\sigma_1^2 + d_1^2) + n_2(\sigma_2^2 + d_2^2)}{n_1 + n_2}$$

Where

σ_1 = S.D. of first group having n_1 items

σ_2 = S.D. of second group having n_2 items

$d_1 = \bar{x}_1 - \bar{x}$, $d_2 = \bar{x}_2 - \bar{x}$

\bar{x}_1 = mean of first group

\bar{x}_2 = mean of second group

\bar{x} = combined mean of two groups

$$= \frac{n_1 \bar{x}_1 + n_2 \bar{x}_2}{n_1 + n_2}$$

5. Coefficient of Variation (C.V.):

$$\text{C.V.} = \frac{\text{S.D.}}{|\text{Mean}|} \times 100 = \frac{\sigma}{|\bar{x}|} \times 100$$



Shortcuts

1. Standard deviation \leq Range.
i.e., Variance \leq (Range)²
2. S.D. of first n natural numbers is $\sqrt{\frac{n^2-1}{12}}$.



Classical Thinking



8.1 Range, Variance and Standard Deviation

- Which of the following is not a measure of dispersion?
 (A) Mean
 (B) Variance
 (C) Standard deviation
 (D) Range
- The range of 6, 10, 15, 25, 30, 32, 40, 46 is
 (A) 40 (B) 46
 (C) 6 (D) 36
- The range of 90, 50, 72, 69, 85, 100, 73, 85, 93 is
 (A) 100 (B) 93
 (C) 50 (D) 43
- The range of the following data is

Wages in thousands	No. of workers
10 – 20	53
20 – 30	35
30 – 40	20
40 – 50	12

- (A) 53 (B) 30
(C) 40 (D) 12
- Variance is independent of change of
 (A) origin only
 (B) scale only
 (C) origin and scale both
 (D) none of these
- If each observation of a raw data whose variance σ^2 is multiplied by h , then the variance of the new set is
 (A) σ^2 (B) $h^2\sigma^2$
 (C) $h\sigma^2$ (D) $h + \sigma^2$
- The variance for the following frequency distribution is

C.I.	2 – 4	4 – 6	6 – 8	8 – 10
f_i	3	4	2	1

- (A) 1.89 (B) 3.56
(C) 4.57 (D) 2.34
- For a frequency distribution, standard deviation is computed by applying the formula
 (A) $\frac{\sum f_i(x_i - \bar{x})}{\sum f_i}$ (B) $\frac{\sqrt{\sum f_i(x_i - \bar{x})^2}}{\sum f_i}$
 (C) $\sqrt{\frac{\sum f_i(x_i - \bar{x})^2}{\sum f_i}}$ (D) $\frac{\sqrt{\sum f_i(x_i - \bar{x})}}{\sum f_i}$

- If V is the variance and σ is the standard deviation, then
 (A) $V^2 = \sigma$ (B) $V = \sigma^2$
 (C) $V = \frac{1}{\sigma}$ (D) $V = \frac{1}{\sigma^2}$
- The standard deviation of the data 6, 5, 9, 13, 12, 8, 10 is
 (A) $\sqrt{\frac{52}{7}}$ (B) $\frac{52}{7}$
 (C) $\sqrt{6}$ (D) 6
- If the standard deviation of 1, 2, 3, 4, ..., 10 is σ , then the standard deviation of 11, 12, 13, 14, ..., 20 is
 (A) $\sigma + 10$ (B) 10σ
 (C) σ (D) σ^2
- If the S.D. of x_1, x_2, \dots, x_n is 5, then the S.D. of $x_1 + 5, x_2 + 5, x_3 + 5, \dots, x_n + 5$, is
 (A) 0 (B) 10
 (C) 5 (D) 25
- The S.D. of 15 items is 6 and if each item is decreased or increased by 1, then standard deviation will be
 (A) 5 (B) 7
 (C) $\frac{91}{15}$ (D) 6
- If the S.D. of a set of observations is 8 and if each observation is divided by -2 , then S.D. of the new set of observations will be
 (A) -4 (B) -8
 (C) 8 (D) 4



8.2 Standard Deviation for Combined data, Coefficient of variation

- For a certain data, following information is available. Obtain the combined standard deviation.

	X	Y
Mean	13	17
S. D.	3	2
Size	20	30

- (A) 9.84 (B) 1.54
(C) 3.14 (D) 15.4
- The means of two samples of sizes 60 and 120 respectively are 35.4 and 30.9 and the standard deviations are 4 and 5. Obtain the standard deviation of the sample of size 180 obtained by combining the two samples.
 (A) 5.15 (B) 26.5
 (C) 32.4 (D) 51.5



17. From the following data available for 5 pairs of observations of two variables x and y , obtain the combined S.D. for all 10 observations.

Where,

$$\sum_{i=1}^n x_i = 30, \sum_{i=1}^n y_i = 40, \sum_{i=1}^n x_i^2 = 220, \sum_{i=1}^n y_i^2 = 340$$

- (A) 7 (B) 2.65
(C) 8 (D) 4
18. In a series of observations, S.D. = 7 and mean is 28, then coefficient of variation is
(A) 4 (B) $\frac{1}{4}$
(C) 25 (D) 12.5
19. For a given distribution of marks, mean is 35.16 and its standard deviation is 19.76. Then 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) $\frac{19.76}{35.16} \times 100$
20. If the C.V. and standard deviation of a distribution are 50 and 20 respectively, then its mean is
(A) 40 (B) 30
(C) 20 (D) 35
21. In a series of observations, coefficient of variation is 16 and mean is 25, then the variance is
(A) 4 (B) 8 (C) 12 (D) 16
22. The C.V. for the set of observations 55, 54, 52, 53, 56, 58, 52, 50, 51, 49 is
(A) 2.64 (B) 3.74
(C) 4.98 (D) 5.78



Critical Thinking



8.1 Range, Variance and Standard Deviation

1. Which of the following is a measure of dispersion?
(A) Mean
(B) Median
(C) Mode
(D) Standard deviation
2. If the range of 15, 14, x , 25, 30, 35 is 23, then the least possible value of x is
(A) 14 (B) 12
(C) 13 (D) 11
3. Variance of the numbers 3, 7, 10, 18, 22, is equal to
(A) 12 (B) 6.4
(C) $\sqrt{49.2}$ (D) 49.2

4. The variance of the following frequency distribution

CI:	0 – 6	6 – 12	12 – 18
f _i :	2	4	6

is

- (A) 24 (B) 12 (C) 20 (D) 25
5. The variance of α , β and γ is 9, then variance of 5α , 5β and 5γ is
(A) 45 (B) $\frac{9}{5}$ (C) $\frac{5}{9}$ (D) 225
6. If the variance of the data 2, 4, 5, 6, 8, 17 is 23.33, then the variance of 4, 8, 10, 12, 16, 34, is
(A) 23.33 (B) 25.33
(C) 46.66 (D) 93.32
7. Suppose a population A has 100 observations 101, 102, ..., 200 and another population B has 100 observations 151, 152, ..., 250. If V_A and V_B represent the variances of the two populations respectively, then $\frac{V_A}{V_B}$ is
(A) 1 (B) $\frac{9}{4}$ (C) $\frac{4}{9}$ (D) $\frac{2}{3}$
8. The mean of 5 observations is 4.4 and their variance is 8.24. If three observations are 1, 2 and 6, the other two observations are
(A) 4 and 8 (B) 4 and 9
(C) 5 and 7 (D) 5 and 9
9. The mean of 100 observations is 50 and their standard deviation is 5. The sum of the squares of all observations is
(A) 50000 (B) 250000
(C) 252500 (D) 255000
10. Suppose values taken by a variable x are such that $a \leq x_i \leq b$, where x_i denotes the value of x in the i^{th} case for $i = 1, 2, \dots, n$. Then
(A) $a \leq \text{Var}(x) \leq b$
(B) $a^2 \leq \text{Var}(x) \leq b^2$
(C) $\frac{a^2}{4} \leq \text{Var}(x)$
(D) $(b - a)^2 \geq \text{Var}(x)$
11. The S.D. of 7 scores 1, 2, 3, 4, 5, 6, 7 is
(A) 4 (B) 2
(C) $\sqrt{7}$ (D) $\sqrt{2}$
12. The standard deviation of the observations 22, 26, 28, 20, 24, 30 is
(A) 2 (B) 2.4
(C) 3 (D) 3.42
13. If standard deviation of a variate x is 10, then S.D. of the variate $(50 + 5x)$ will be
(A) 10 (B) 50
(C) 500 (D) 100



14. If the S.D. of $y_1, y_2, y_3, \dots, y_n$ is 6, then the variance of $y_1 - 3, y_2 - 3, y_3 - 3, \dots, y_n - 3$, is
 (A) 6 (B) 36
 (C) 3 (D) 27
15. The mean and S.D. of the marks of 200 candidates were found to be 40 and 15 respectively. Later, it was discovered that a score of 40 was wrongly read as 50. The correct mean and S.D. respectively are
 (A) 14.98, 39.95 (B) 39.95, 14.98
 (C) 39.95, 224.5 (D) None of these
16. The mean and standard deviation of a distribution are 16 and 4 respectively. If every value is increased by 2, then
 (A) mean and S.D. each will be increased by 2.
 (B) mean will be increased by 2 but S.D. will remain same.
 (C) S.D. will be increased by 2 where as mean will be same.
 (D) both will remain the same.
17. What is the standard deviation of the following series

Measurements	0-10	10-20	20-30	30-40
Frequency	1	3	4	2

- (A) 81 (B) 7.6
 (C) 9 (D) 2.26

8.2 Standard Deviation for Combined data, Coefficient of variation

18. The mean height of 200 students is 65 inches. The mean heights of boys and girls are 70 inches and 62 inches respectively and the standard deviations are 8 and 10 respectively. Find the number of boys and the combined S.D.
 (A) 75 and 10.07 (B) 125 and 10.07
 (C) 75 and 101.5 (D) 125 and 101.5
19. The S.D. and C.V. for the data 75, 78, 80, 86, 91, 88, 83 is
 (A) 4.98 and 5.67 (B) 5.29 and 6.37
 (C) 4.98 and 6.37 (D) 5.29 and 5.67
20. The C.V. for the following frequency distribution is

x_i	133	134	135	136	137
f_i	5	4	13	8	5

- (A) 0.99 (B) 1.34
 (C) 0.59 (D) 1.78

21. The variance and C.V. for the following frequency distribution is

x_i	60	61	62	63	64	65	66
f_i	3	10	11	13	7	5	1

- (A) 2.12 and 2.33 (B) 3.12 and 3.33
 (C) 1.46 and 2.33 (D) 1.46 and 3.33
22. 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



Competitive Thinking



8.1 Range, Variance and Standard Deviation

1. The variance of the data 2, 4, 6, 8, 10 is
[Orissa JEE 2010]
 (A) 6 (B) 7
 (C) 8 (D) None of these
2. The variance of first 50 even natural numbers is
[JEE (Main) 2014; EAMCET 2016]
 (A) 437 (B) $\frac{437}{4}$
 (C) $\frac{833}{4}$ (D) 833
3. The variance of first 20 natural numbers is
[WB JEE 2015]
 (A) $\frac{133}{4}$ (B) $\frac{279}{12}$ (C) $\frac{133}{2}$ (D) $\frac{399}{4}$
4. The mean and variance of n observations $x_1, x_2, x_3, \dots, x_n$ are 5 and 0 respectively. If $\sum_{i=1}^n x_i^2 = 400$, then the value of n is equal to
[Kerala (Engg.) 2010]
 (A) 80 (B) 25
 (C) 20 (D) 16
5. The mean and variance of seven observations are 8 and 16, respectively. If 5 of the observations are 2, 4, 10, 12, 14, then the product of the remaining two observations is
[JEE (Main) 2019]
 (A) 45 (B) 49
 (C) 48 (D) 40
6. 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 ?
[AIEEE 2008]
 (A) $a = 5, b = 2$ (B) $a = 1, b = 6$
 (C) $a = 3, b = 4$ (D) $a = 0, b = 7$



7. In an experiment with 15 observations on x , the following results were available $\Sigma x^2 = 2830$, $\Sigma x = 170$. Upon observation 20 were found to be wrong and were replaced by the correct value 30. Then the corrected variance is
[AIEEE 2003]
(A) 78.00 (B) 188.66
(C) 177.33 (D) 8.33
- OR**
- For a data consisting of 15 observations x_i , $i = 1, 2, 3, \dots, 15$ the following results are obtained : $\sum_{i=1}^{15} x_i = 170$; $\sum_{i=1}^{15} x_i^2 = 2830$. If one of the observation namely 20 was found wrong and was replaced by its correct value 30, then the corrected variance is [AP EAMCET 2019]
(A) 80 (B) 78
(C) 76 (D) 75
8. In a data with 15 number of observations $x_1, x_2, x_3, \dots, x_{15}$, $\sum_{i=1}^{15} x_i^2 = 3600$ and $\sum_{i=1}^{15} x_i = 175$. If the value of one observation 20 was found wrong and was replaced by its correct value 40, then the corrected variance of that data is [TS EAMCET 2019]
(A) 151 (B) 149
(C) 145 (D) 144
9. Mean and standard deviation of 100 items are 50 and 4 respectively. The sum of all squares of the items is [Karnataka CET 2019]
(A) 256100 (B) 261600
(C) 251600 (D) 266000
10. The standard deviation of the numbers 31, 32, 33, ..., 46, 47 is [DCE 2000; Kerala (Engg.) 2007]
(A) $\sqrt{\frac{17}{12}}$ (B) $\sqrt{\frac{47^2-1}{12}}$
(C) $2\sqrt{6}$ (D) $4\sqrt{3}$
11. If the standard deviation of the numbers 2, 3, a and 11 is 3.5, then which of the following is true? [JEE (Main) 2016]
(A) $3a^2 - 26a + 55 = 0$
(B) $3a^2 - 32a + 84 = 0$
(C) $3a^2 - 34a + 91 = 0$
(D) $3a^2 - 23a + 44 = 0$
12. If the standard deviation of 0, 1, 2, 3, ..., 9 is K , then the standard deviation of 10, 11, 12, 13, ..., 19 is [BCECE 2015]
(A) K (B) $K + 10$
(C) $K + \sqrt{10}$ (D) $10K$
13. If X is a random variable such that $\sigma(x) = 2.6$, then $\sigma(1 - 4x)$ is equal to [WB JEE 2019]
(A) 7.8 (B) -10.4
(C) 13 (D) 10.4
14. A scientist is weighing each of 30 fishes. Their mean weight worked out is 30 gm and standard deviation of 2 gm. Later, it was found that the measuring scale was misaligned and always under reported every fish weight by 2 gm. The correct mean and standard deviation (in gm) of fishes are respectively [AIEEE 2011]
(A) 32, 4 (B) 28, 2
(C) 28, 4 (D) 32, 2
15. In a series of $2n$ observations, half of them equal to a and remaining half equal to $-a$. If the standard deviation of the observations is 2, then $|a|$ equals [AIEEE 2004]
(A) $\frac{\sqrt{2}}{n}$ (B) $\sqrt{2}$
(C) 2 (D) $\frac{1}{n}$



8.2 Standard Deviation for Combined data, Coefficient of variation

16. 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 [AIEEE 2010]
(A) $\frac{5}{2}$ (B) $\frac{11}{2}$
(C) 6 (D) $\frac{13}{2}$
17. If the coefficient of variation and standard deviation are 60 and 21 respectively, the arithmetic mean of distribution is [Karnataka CET 2014]
(A) 60 (B) 30
(C) 35 (D) 21
18. If the coefficient of variation and variance of a frequency distribution are 7.2 and 3.24 respectively, then its mean is [TS EAMCET 2019]
(A) 45 (B) 25
(C) 20 (D) 16
19. If the coefficient of variation of a distribution is 45% and the mean is 12, then its standard deviation is [AMU 2009]
(A) 5.2 (B) 5.3
(C) 5.4 (D) None of these



20. If the mean of 10 observations is 50 and the sum of the squares of the deviations of the observations from the mean is 250, then the coefficient of variation of those observations is [EAMCET 2016]
- (A) 25 (B) 50
(C) 10 (D) 5
21. Coefficient of variations of two distributions are 55 and 65 and their deviations are 22 and 39 respectively. Their arithmetic means are respectively [AMU 2010]
- (A) 15, 20 (B) 40, 60
(C) 30, 50 (D) None of these
22. Two teams A and B have the same mean and their coefficients of variation are 4, 2 respectively. If σ_A, σ_B are the standard deviations of teams A, B respectively then the relation between them is. [EAMCET 2015]
- (A) $\sigma_A = \sigma_B$ (B) $\sigma_B = 2\sigma_A$
(C) $\sigma_A = 2\sigma_B$ (D) $\sigma_B = 4\sigma_A$



Answer Key



Classical Thinking

1. (A) 2. (A) 3. (C) 4. (C) 5. (A) 6. (B) 7. (B) 8. (C) 9. (B) 10. (A)
11. (C) 12. (C) 13. (D) 14. (D) 15. (C) 16. (A) 17. (B) 18. (C) 19. (D) 20. (A)
21. (D) 22. (C)



Critical Thinking

1. (D) 2. (B) 3. (D) 4. (C) 5. (D) 6. (D) 7. (A) 8. (B) 9. (C) 10. (D)
11. (B) 12. (D) 13. (B) 14. (B) 15. (B) 16. (B) 17. (C) 18. (A) 19. (B) 20. (A)
21. (A) 22. (A)



Competitive Thinking

1. (C) 2. (D) 3. (A) 4. (D) 5. (C) 6. (C) 7. (A) 8. (A) 9. (C) 10. (C)
11. (B) 12. (A) 13. (D) 14. (B) 15. (C) 16. (B) 17. (C) 18. (B) 19. (C) 20. (C)
21. (B) 22. (C)



Evaluation Test

1. For a frequency distribution, standard deviation is computed by applying the formula
- (A) $\sigma = \sqrt{\frac{\sum fd}{\sum f} - \frac{\sum fd^2}{\sum f}}$
(B) $\sigma = \sqrt{\frac{\sum fd^2}{\sum f} - \left(\frac{\sum fd}{\sum f}\right)^2}$
(C) $\sigma = \sqrt{\frac{(\sum fd)^2}{\sum f} - \sum fd^2}$
(D) $\sigma = \sqrt{\frac{\sum fd^2}{\sum f} - \left(\frac{\sum fd}{\sum f}\right)^2}$
2. The S.D. of the first n natural numbers is
- (A) $\frac{n+1}{2}$ (B) $\sqrt{\frac{n(n+1)}{2}}$
(C) $\sqrt{\frac{n^2-1}{12}}$ (D) None of these
3. One set containing five numbers has mean 8 and variance 18 and the second set containing 3 numbers has mean 8 and variance 24. Then the variance of the combined set of numbers is
- (A) 42 (B) 20.25
(C) 18 (D) None of these
4. If x_1, x_2, \dots, x_{18} are observations such that $\sum_{j=1}^{18} (x_j - 8) = 9$ and $\sum_{j=1}^{18} (x_j - 8)^2 = 45$, then the standard deviation of these observation is
- (A) $\sqrt{\frac{81}{34}}$ (B) 5
(C) $\sqrt{5}$ (D) $\frac{3}{2}$



5. The variance of α , β and γ is 9, then variance of 5α , 5β and 5γ is
- (A) 45 (B) $\frac{9}{5}$
(C) $\frac{5}{9}$ (D) 225
6. The means 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
7. The S.D. of a variate x is σ . Then S.D. of the variate $\frac{ax+b}{c}$ where a , b , c are constant, is
- (A) $\left(\frac{a}{c^2}\right)\sigma$ (B) $\left|\frac{a}{c}\right|\sigma$
(C) $\left(\frac{a^2}{c^2}\right)\sigma$ (D) None of these

**Answers to Evaluation Test**

1. (D) 2. (C) 3. (B) 4. (D)
5. (D) 6. (C) 7. (B)