SAMPLE CONTENT

TRIUMPH

MHT-CET

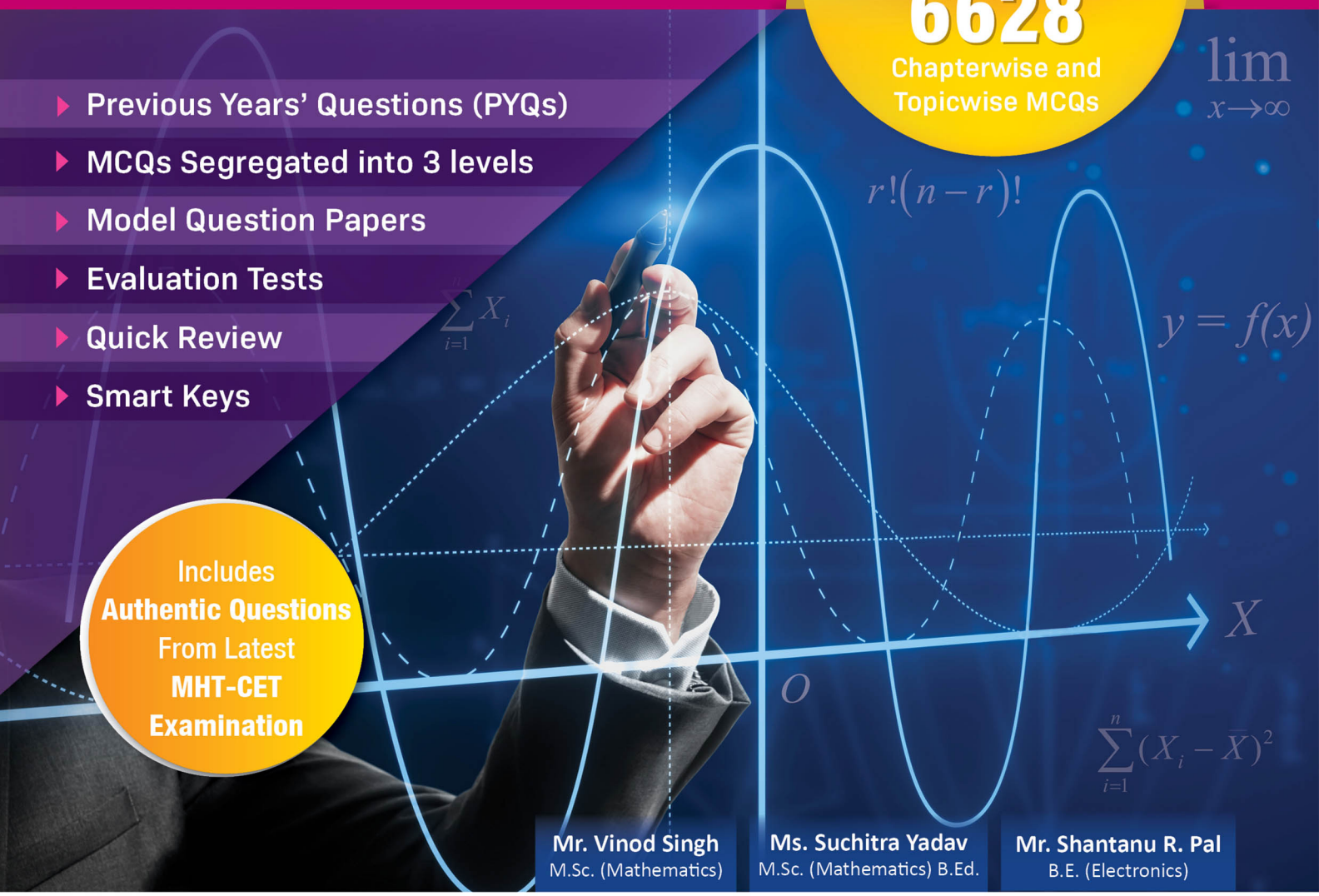
MATHEMATICS

BASED ON STD. XI & XII SYLLABUS OF MHT-CET

6628
Chapterwise and Topicwise MCQs

- Previous Years' Questions (PYQs)
- MCQs Segregated into 3 levels
- Model Question Papers
- Evaluation Tests
- Quick Review
- Smart Keys

Includes **Authentic Questions** From Latest **MHT-CET Examination**



Mr. Vinod Singh
M.Sc. (Mathematics)

Ms. Suchitra Yadav
M.Sc. (Mathematics) B.Ed.

Mr. Shantanu R. Pal
B.E. (Electronics)

Target Publications® Pvt. Ltd.

Written in accordance with the latest MHT-CET Paper Pattern prescribed by State Common Entrance Test Cell, Maharashtra State

TRIUMPH MHT-CET MATHEMATICS

6628 MCQS

Based on the latest Syllabus of MHT-CET

Salient Features

- Includes chapters of Std. XII and relevant chapters of Std. XI as per the latest MHT-CET Syllabus
- Includes '6628' MCQs
- Quick Review and exhaustive subtopic wise coverage of MCQs
- Solved Previous Years' MHT-CET questions till 2023
- Evaluation Test for each chapter
- Two Model Question Papers with answer keys (Solutions provided through Q.R. codes)
- Two Question Papers & Answer Keys of MHT-CET 2023 (Solutions provided through Q.R. codes)
- Includes **Smart Keys** (Caution, Shortcuts & Thinking Hatke)
- 'Real-world applications' in each chapter
- Answer keys for all the chapters and Evaluation Tests at the end of book
- *Solutions to MCQs and Evaluation Test can be accessed through Q.R. code given at the end of each chapter*

Sample Content

Printed at: **Print to Print,** Mumbai

© *Target Publications Pvt. Ltd.*
No part of this book may be reproduced or transmitted in any form or by any means, C.D. ROM/Audio Video Cassettes or electronic, mechanical including photocopying; recording or by any information storage and retrieval system without permission in writing from the Publisher.

Balbharati Registration No.: 2018MH0022

TEID: 3238

P.O. No. 9856

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 Standard XII. We are aware of the 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 topics).

We believe that although the syllabus for Std. XII and XI and MHT-CET is aligned, the outlook for studying the subject should be altered based on the nature of the examination. To score well in the 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.

As a first step to MCQ solving, students should start with elementary questions. Once momentum is gained, complex MCQs with a higher level of difficulty should be practised. Such holistic preparation is the key to succeeding in the examination!

Target's **Triumph MHT-CET Mathematics** book has been designed to achieve the above objectives. Beginning with basic MCQs, the book proceeds to develop competence to solve complex MCQs. It offers ample practice of recent questions from MHT-CET examinations. It also includes solutions (via QR codes) that provide explanations to help students learn how to solve the MCQs. Relevant solutions are complemented by Alternate Methods.

The sections of **Quick Review** and **MCQs (Classical, Critical, Concept Fusion, Previous Years' MHT-CET Questions, Evaluation Test)** form the backbone of every chapter and ensure adequate revision.

To optimise learning efficiency, multiple study techniques are included in every chapter in the form of **Smart Keys** *(Shortcuts, Caution & Thinking Hatke)*.

The two **Model Question Papers** given at the end of the book are specially prepared to gauge the student's preparedness to appear for the MHT-CET examination. Two **MHT-CET 2023 Question Papers** have been provided to offer students a glimpse of the complexity of the questions asked in the examination.

All the features of this book pave the way for a student to excel in the examination. The features are designed keeping the following elements in mind: Time management, easy memorization or revision, and non-conventional yet simple methods for MCQ solving. The features of the book presented on the next page will explain more about them!

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

Publisher
Edition: Second

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

Sample Content

Disclaimer

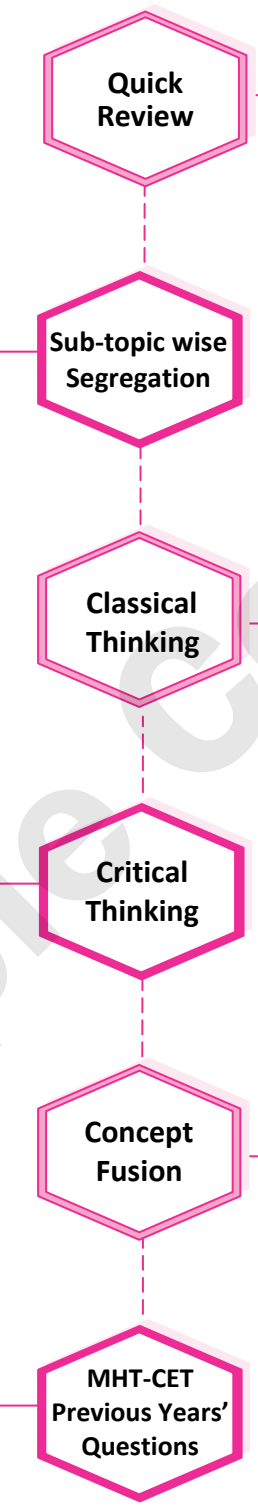
This reference book is transformative work based on Std. XI and XII Mathematics Textbooks; Reprint: 2022 published by the Maharashtra State Bureau of Textbook Production and Curriculum Research, Pune. We the publishers are making this reference book which constitutes as fair use of textual contents which 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.

This work is purely inspired upon the course work as prescribed by the Maharashtra State Bureau of Textbook Production and Curriculum Research, Pune. Every care has been taken in the publication of this reference book by the Authors while creating the contents. The Authors and the Publishers shall not be responsible for any loss or damages caused to any person on account of errors or omissions which might have crept in or disagreement of any third party on the point of view expressed in the reference book.

© reserved with the Publisher for all the contents created by our Authors.

No copyright is claimed in the textual contents which are presented as part of fair dealing with a view to provide best supplementary study material for the benefit of students.

FEATURES



Quick Review 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.

MCQs are **segregated sub-topic wise.**
This is our attempt to cater to individualistic pace and preferences of studying a chapter in students and enable easy assimilation of questions based on the specific concept.

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 students to deal with complex MCQs.

Critical Thinking section encompasses challenging questions which test understanding, rational thinking and application skills of students.
This is our attempt to take students from beginner to proficient level in smooth steps.

Concept Fusion section encompasses whose solutions require knowledge of concepts covered in different sub-topics of same chapter or from different chapters.
This is our attempt to develop cognitive thinking in the students essential to solve questions involving fusion of multiple key concepts.

MHT-CET Previous Years' Questions section encompasses questions from MHT-CET examinations.
This is our attempt to give students practice of MHT-CET questions and advance them to acquire knack essential to solve such questions.

Sample Content

Continued…

FEATURES

Evaluation Test encompasses questions based on concepts covered in the entire chapter.
This is our attempt to allow self-assessment of the chapter

Smart Keys comprise a set of remarkable study techniques contrived to benefit students.
This is our attempt to promote quick, innovative, and divergent thinking as well as enable the students to perceive the underlying depth and implications of concepts

Caution apprises students about mistakes often made while solving MCQs.

Shortcuts incorporate important theoretical or formula based short tricks, beneficial in solving MCQs.

Thinking Hatke reveals quick witted approach to crack the specific question.

Each chapter includes **real-world applications or examples** related to the concept discussed.
This is our attempt to link learning to the life and make students conscious of how Mathematics is related to everything we see, feel, touch and taste.

QR Code includes

- Solutions to MCQs and Evaluation Test for each chapter
- Solutions to Model Question Papers I and II
- Solutions to MHT-CET 2023 Question Papers

Sample Content

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
  i. the entire syllabus of Std. XII of Physics, Chemistry, Mathematics and Biology subjects and
  ii. 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

Sample Content

CONTENTS

Sr. No.	Textbook Chapter No.	Chapter Name	Page No.
		Std. XI	
1	3	Trigonometry - II	1
2	5	Straight Line	24
3	6	Circle	46
4	8	Measures of Dispersion	62
5	9	Probability	69
6	1	Complex Numbers	87
7	3	Permutations and Combinations	109
8	6	Functions	122
9	7	Limits	136
10	8	Continuity	152
		Std. XII	
11	1	Mathematical Logic	169
12	2	Matrices	189
13	3	Trigonometric Functions	205
14	4	Pair of Straight Lines	232
15	5	Vectors	245
16	6	Line and Plane	276
17	7	Linear Programming	307
18	1	Differentiation	325
19	2	Applications of Derivatives	353
20	3	Indefinite Integration	378
21	4	Definite Integration	418
22	5	Application of Definite Integration	441
23	6	Differential Equations	453
24	7	Probability Distributions	479
25	8	Binomial Distribution	493
		Answer Key	501
		Model Question Paper I & Answer Key	532
		Model Question Paper II & Answer Key	536
		MHT-CET 9th May, 2023 Question Paper & Answer Key	541
		MHT-CET 10th May, 2023 Question Paper & Answer Key	546

Practice test Papers are the only way to assess your preparedness for the Exams.
Scan the adjacent QR code to know more about our ***"MHT-CET Mathematics Test Series with Answer Key & Solutions"*** book for the MHT-CET Entrance examination.

Sample Content

Chapter

8

Measures of Dispersion

Application of Measures of Dispersion in Financial Planning

Measures of dispersion, such as the standard deviation, can be Helpful in assessing the risk associated with investments. Investors and financial analysts use these measures to understand how much the returns of a particular investment may vary over time. A higher dispersion indicates higher risk, which can influence investment decisions.

Chapter Outline

8.1 Range, Variance and Standard Deviation

8.2 Standard Deviation for Combined data, Coefficient of variation

Quick Review

Measures of Dispersion

Range

R = Largest value of data − Smallest value of data = L − S

Variance

Ungrouped data

$$\text{Variance } (\sigma^2) = \frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x})^2 \text{ or } \frac{1}{n}\left(\sum_{i=1}^{n}x_i^2\right) - (\bar{x})^2$$

Grouped data

$$\text{Variance } (\sigma^2) = \frac{1}{N}\sum_{i=1}^{n} f_i (x_i - \bar{x})^2 \text{ or } \frac{1}{N}\left(\sum_{i=1}^{n} f_i x_i^2\right) - (\bar{x})^2$$

Standard deviation

Ungrouped data

$$\text{S.D. } (\sigma) = \sqrt{\frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x})^2} \text{ or } \sqrt{\frac{1}{n}\left(\sum_{i=1}^{n}x_i^2\right) - (\bar{x})^2}$$

Grouped data

$$\text{S.D. } (\sigma) = \sqrt{\frac{1}{N}\sum_{i=1}^{n} f_i (x_i - \bar{x})^2} \text{ or } \sqrt{\frac{1}{N}\left(\sum_{i=1}^{n} f_i x_i^2\right) - (\bar{x})^2}$$

Coefficient of Variation (C.V.)

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

Change of Origin and Scale

For $y_i = h(x_i + A)$, $\sigma_y^2 = h^2 \sigma_x^2$

Change of Origin and Scale

For $y_i = h(x_i + A)$, $\sigma_y = |h| \sigma_x$

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

Sample Content

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

1. Which of the following is not a measure of dispersion?
(A) Mean
(B) Variance
(C) Standard deviation
(D) Range

2. Which of the following is a measure of dispersion?
(A) Mean
(B) Median
(C) Mode
(D) Standard deviation

3. The range of
90, 50, 72, 69, 85, 100, 73, 85, 93 is
(A) 100 (B) 93
(C) 50 (D) 43

4. 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

5. 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

6. Variance is independent of change of
(A) origin only
(B) scale only
(C) origin and scale both
(D) none of these

7. 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) $h + \sigma^2$

8. 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

9. 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) $V = \frac{1}{\sigma^2}$

10. The variance of the data 2, 4, 6, 8, 10 is
(A) 6 (B) 7
(C) 8 (D) None of these

11. The variance of first 20 natural numbers is
(A) $\frac{133}{4}$ (B) $\frac{279}{12}$ (C) $\frac{133}{2}$ (D) $\frac{399}{4}$

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

13. The S.D. of 7 scores 1, 2, 3, 4, 5, 6, 7 is
(A) 4 (B) 2
(C) $\sqrt{7}$ (D) $\sqrt{2}$

14. 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

15. If the S.D. of $x_1, x_2, \ldots, x_n$ is 5, then the S.D. of $x_1 + 5, x_2 + 5, x_3 + 5, \ldots, x_n + 5$, is
(A) 0 (B) 10
(C) 5 (D) 25

16. 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

Sample Content

17. Mean and standard deviation of 100 items are 50 and 4 respectively. The sum of all squares of the items is
(A) 256100 (B) 261600
(C) 251600 (D) 266000

18. 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

19. If the standard deviation of the numbers 2, 3, a and 11 is 3.5, then which of the following is true?
(A) $3a^2 - 26a + 55 = 0$
(B) $3a^2 - 32a + 84 = 0$
(C) $3a^2 - 34a + 91 = 0$
(D) $3a^2 - 23a + 44 = 0$

20. If X is a random variable such that $\sigma(x) = 2.6$, then $\sigma(1 - 4x)$ is equal to
(A) 7.8 (B) –10.4
(C) 13 (D) 10.4

21. If the S.D. of $y_1, y_2, y_3, \ldots, y_n$ is 6, then the variance of $y_1 - 3, y_2 - 3, y_3 - 3, \ldots, y_n - 3$, is
(A) 6 (B) 36
(C) 3 (D) 27

8.2 Standard Deviation for Combined data, Coefficient of variation

1. 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
(A) $\frac{5}{2}$ (B) $\frac{11}{2}$
(C) 6 (D) $\frac{13}{2}$

2. 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) $\frac{19.76}{35.16} \times 100$

3. 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

4. If the coefficient of variation and standard deviation are 60 and 21 respectively, the arithmetic mean of distribution is
(A) 60 (B) 30 (C) 35 (D) 21

5. If the coefficient of variation and variance of a frequency distribution are 7.2 and 3.24 respectively, then its mean is
(A) 45 (B) 25 (C) 20 (D) 16

6. 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

7. 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

8. If the coefficient of variation of a distribution is 45% and the mean is 12, then its standard deviation is
(A) 5.2 (B) 5.3
(C) 5.4 (D) None of these

9. If the mean of 10 observations is 50 and the sum of the squares of the deviations of the observations from the mean in 250, then the coefficient of variation of those observations is
(A) 25 (B) 50 (C) 10 (D) 5

Critical Thinking

8.1 Range, Variance and Standard Deviation

1. The variance of first 50 even natural numbers is
(A) 437 (B) $\frac{437}{4}$
(C) $\frac{833}{4}$ (D) 833

2. 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

3. The mean and variance of n observations $x_1, x_2, x_3, \ldots, x_n$ are 5 and 0 respectively. If $\sum_{i=1}^{n} x_i^2 = 400$, then the value of n is equal to
(A) 80 (B) 25 (C) 20 (D) 16

4. 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) $\frac{2}{3}$

Sample Content

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

(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?

(A) a = 5, b = 2 (B) a = 1, b = 6
(C) a = 3, b = 4 (D) a = 0, b = 7

7. Suppose values taken by a variable x are such that $a \le x_i \le b$, where x_i denotes the value of x in the i^{th} case for i = 1, 2, …, n. Then

(A) $a \le \text{Var}(x) \le b$
(B) $a^2 \le \text{Var}(x) \le b^2$
(C) $\frac{a^2}{4} \le \text{Var}(x)$
(D) $(b-a)^2 \ge \text{Var}(x)$

8. For a data consisting of 15 observations x_i, i = 1, 2, 3, …, 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

(A) 80 (B) 78
(C) 76 (D) 75

9. The standard deviation of the numbers 31, 32, 33, …, 46, 47 is

(A) $\sqrt{\frac{17}{12}}$ (B) $\sqrt{\frac{47^2-1}{12}}$
(C) $2\sqrt{6}$ (D) $4\sqrt{3}$

10. 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

11. 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

(A) 32, 4 (B) 28, 2
(C) 28, 4 (D) 32, 2

12. 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

13. 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

(A) $\frac{\sqrt{2}}{n}$ (B) $\sqrt{2}$
(C) 2 (D) $\frac{1}{n}$

8.2 Standard Deviation for Combined data, Coefficient of variation

1. 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

2. 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

3. 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

4. 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

Sample Content

5. 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

6. 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

7. Coefficient of variations of two distributions are 55 and 65 and their deviations are 22 and 39 respectively. Their arithmetic means are respectively
(A) 15, 20 (B) 40, 60
(C) 30, 50 (D) None of these

8. 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.
(A) $\sigma_A = \sigma_B$ (B) $\sigma_B = 2\sigma_A$
(C) $\sigma_A = 2\sigma_B$ (D) $\sigma_B = 4\sigma_A$

MHT-CET Previous Years' Questions

1. If 1 is added to first 10 natural numbers, then variance of the numbers so obtained is **[2021]**
(A) 8.25 (B) 3.87
(C) 6.5 (D) 2.87

2. If the variance of the numbers 2, 3, 11 and x is $\frac{49}{4}$, then the values of x are **[2021]**
(A) 6, $\frac{14}{3}$ (B) 4, $\frac{13}{5}$
(C) 6, $\frac{16}{3}$ (D) 6, $\frac{14}{5}$

3. Following data shows the information about marks obtained in Physics, Chemistry, Mathematics and Biology by 100 students in a class. Then _____ subject shows the highest variability in marks

	Physics	Chemistry	Mathematics	Biology
Mean	20	25	23	27
S.D.	3	2	4	5

[2021]
(A) Mathematics (B) Chemistry
(C) Biology (D) Physics

4. Given that total of 16 values is 528 and sum of the squares of deviation from 33 is 9158. The variance is **[2021]**
(A) 562.73 (B) 570.375
(C) 574.375 (D) 572.375

5. If the standard deviation of data is 12 and mean is 72, then coefficient of variation is **[2021]**
(A) 15.67% (B) 14.67%
(C) 13.67% (D) 16.67%

6. The arithmetic mean of marks in Mathematics for four divisions A, B, C and D were 80, 75, 70 and 72 respectively. Their standard deviations were 12, 6, 8 and 10 respectively. Then division _____ has more uniformity. **[2021]**
(A) D (B) B (C) C (D) A

7. For the set of 50 observations, the sum of their squares is 3050, their arithmetic mean is 6. Hence the standard deviation of these observations is **[2021]**
(A) 5 (B) 3 (C) 4 (D) 6

8. The variance of first 10 multiples of 3 is **[2022]**
(A) 74.25 (B) 73.15
(C) 70.15 (D) 74.15

9. If the standard deviation of first n natural numbers is 2, then the value of n is **[2022]**
(A) 4 (B) 6 (C) 5 (D) 7

10. For the following frequency distribution

X	5	6	7	8	10
Frequency	3	7	4	2	4

The variance is **[2022]**
(A) 2.49 (B) 2.85
(C) 2.18 (D) 2.37

11. If for some positive $x \in R$, the frequency distribution of the marks obtained by 20 students in a certain test, is as follows:

Marks	2	3	5	7
Frequency	$(x+1)^2$	$2x-5$	x^2-3x	x

Then the mean of the marks is **[2022]**
(A) 3.0 (B) 2.5
(C) 2.8 (D) 3.2

Sample Content

12. For given data N = 60, $\sum x^2$ = 18000 and $\sum x$ = 960, then variance of data is **[2022]**

(A) 44 (B) 54
(C) 34 (D) 22

13. The sum of 10 values is 12 and then sum of their squares is 16.9, then their standard deviation (S.D.) is **[2022]**

(A) 0.005 (B) 5
(C) 0.5 (D) 0.05

14. If both mean and the standard of 50 observations $x_1, x_2, \ldots, x_{50}$ are equal to 16, then mean of $(x_1 - 5)^2, (x_2 - 5)^2, \ldots, (x_{50} - 5)^2$ is **[2022]**

(A) 357 (B) 377
(C) 397 (D) 378

15. The variance and mean of 15 observations are respectively 6 and 10. If each observation is increased by 8 then the new variance and new mean of resulting observations are respectively. **[2022]**

(A) 14, 10 (B) 6, 10
(C) 14, 18 (D) 6, 18

16. If the mean and S.D. of the data 3, 5, 7, a, b are 5 and 2 respectively, then a and b are the roots of the equation **[2023]**

(A) $x^2 - 10x + 18 = 0$
(B) $2x^2 - 20x + 19 = 0$
(C) $x^2 - 10x + 19 = 0$
(D) $x^2 - 20x + 18 = 0$

17. Mean and variance of six observations are 8 and 16 respectively. If each observation is multiplied by 3, then new variance of the resulting observations is **[2023]**

(A) 16. (B) 48.
(C) 24. (D) 144.

18. If both mean and variance of 50 observations $x_1, x_2, \ldots, x_{50}$ are equal to 16 and 256 respectively, then mean of $(x_1 - 5)^2, (x_2 - 5)^2, \ldots (x_{50} - 5)^2$ is

(A) 357 (B) 387
(C) 377 (D) 397

19. If the variance of the numbers –1, 0, 1, k is 5, where k > 0, then k is equal to **[2023]**

(A) $2\sqrt{\frac{10}{3}}$ (B) $2\sqrt{6}$
(C) $4\sqrt{\frac{5}{3}}$ (D) $\sqrt{6}$

20. For 20 observations of variable x, if $\sum(x_i - 2) = 20$ and $\sum(x_i - 2)^2 = 100$, then the standard deviation of variable x is **[2023]**

(A) 2 (B) 3
(C) 4 (D) 9

21. Variance of first 2n natural numbers is **[2023]**

(A) $\frac{4n^2 + 1}{12}$ (B) $\frac{(2n-1)^2}{12}$
(C) $\frac{n^2}{3} - 1$ (D) $\frac{4n^2 - 1}{12}$

22. The variance of 20 observations is 5. If each observation is multiplied by 2, then variance of resulting observations is **[2023]**

(A) 5 (B) 10 (C) 4 (D) 20

Evaluation Test

1. 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

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. 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

4. If $x_1, x_2, \ldots, x_{18}$ 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) $\frac{3}{2}$

Sample Content

5. For a frequency distribution, standard deviation is computed by applying the formula

(A) $\sigma = \sqrt{\left(\frac{\Sigma fd}{\Sigma f}\right) - \frac{\Sigma fd^2}{\Sigma f}}$

(B) $\sigma = \sqrt{\frac{\Sigma fd^2}{\Sigma f} - \left(\frac{\Sigma fd^2}{\Sigma f}\right)^2}$

(C) $\sigma = \sqrt{\left(\frac{\Sigma fd}{\Sigma f}\right)^2 - \frac{\Sigma fd^2}{\Sigma f}}$

(D) $\sigma = \sqrt{\frac{\Sigma fd^2}{\Sigma f} - \left(\frac{\Sigma fd}{\Sigma f}\right)^2}$

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. 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

Sample Content

Answer Key of the chapter: *Measures of Dispersion* & Evaluation Test is given at the end of the book.

Solutions to the relevant questions of this chapter & Evaluation Test can be accessed by scanning the adjacent QR code in ***Quill - The Padhai App.***

Give your MHT-CET exam preparation the

TECHNOLOGY BOOST!

Practice more than 23,000 MCQs for just ₹649/-

Use Coupon Code

QUILLPADHAI2023

Also available for Xth, XIth, XIIth, NEET & JEE

- Practice chapter-wise & full syllabus MCQs in test format
- Get instant verification of your answer
- Detailed analysis of every test on completion
- Option to save questions for future reference

Scan QR Code to download the app

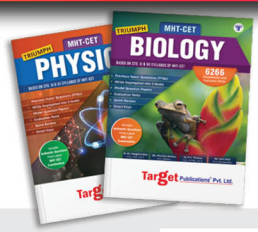
Visit our website to know more about our range of books for Xth, XIth, XIIth, NEET & JEE

Visit Our Website

Target Publications® Pvt. Ltd.
Transforming lives through learning.

Address:
B2, 9th Floor, Ashar, Road No. 16/Z,
Wagle Industrial Estate, Thane (W)- 400604

Tel: 88799 39712 / 13 / 14 / 15
Website: www.targetpublications.org
Email: mail@targetpublications.org



Explore our range of MHT-CET Books