

Class XI
SAMPLE PAPER HALF YEARLY EXAM 2025-2026

SUBJECT - MATHEMATICS

M.M : 80

General Instructions:

1. This Question paper contains - five sections **A, B, C, D and E**. Each section is compulsory. However, there are internal choices in some questions.
2. **Section A** has **18** and **02 Assertion-Reason** based questions of 1 mark each.
3. **Section B** has **5 Very Short Answer (VSA)-type** questions of 2 marks each.
4. **Section C** has **6 Short Answer (SA)-type** questions of 3 marks each.
5. **Section D** has **4 Long Answer (LA)-type** questions of 5 marks each.
6. **Section E** has **3 source based/case based/passage based/integrated units of assessment** of 4 marks each with sub-parts

	SECTION A Each question carries 1 mark	
1	If $A = \{x : x \in R, 0 \leq x \leq 9\}$, write this as an interval.	1
2	Find the slope of the line which is perpendicular to the line joining the points (3,4) and $(-1, 2)$	1
3	If $A = \{1, 2, 3\}$, $B = \{4\}$, $C = \{5\}$ find $A \times (B - C)$.	1
4	If A_1 and A_2 are the two arithmetic means between two numbers a and b , G_1 and G_2 are two geometric means between same two numbers, then find the value of $\frac{A_1 + A_2}{G_1 G_2}$.	1
5	Write the set $A = \{1, \frac{1}{4}, \frac{1}{9}, \frac{1}{16}, \dots\}$ in set builder form	1
6	Name the octant in which Point P (5, 6, -8) lies.	1
7	If $P(11, r) = P(12, r - 1)$ find r .	1
8	Let P(4,4,6) be a point then find Coordinates of foot of perpendicular from P to YZ plane	1
9	A relation R is defined from a set $A = \{2, 3, 4, 5\}$ to a set $B = \{3, 6, 7, 10\}$ as $(x, y) \in R \Leftrightarrow x$ is relatively prime to y.	1

	Express R as a set of ordered pairs.	
10	How many three-digit numbers are there, with distinct digits, with each digit odd?	1
11	Find the Mean deviation about the mean for the given data 8,13,12,9,4,7,10 and 17	1
12	Find the domain of $f(x) = [x]^2 - 3[x] + 2$.	1
13	Find the minimum value of the expression $3^x + 3^{1-x}$, $x \in R$?	1
14	Find the number of sides of an n-sided polygon.	
15	Find the distance between the lines $3x + 4y = 9$ and $6x + 8y = 15$	1
16	Which term of the G.P. 2,8,32,_____ is 131072?	1
17	Find the image of P (6,5, -8) in XZ Plane.	1
18	Find the value of 'y' so that the line through the point (5, y) and (-2, 7) is parallel to the line through the points (-5, 4) and (1,6)	1
19	(ASSERTION-REASONING BASED QUESTIONS) In the following questions, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices. (a) Both A and R are true and R is the correct explanation of A. (b) Both A and R are true but R is not the correct explanation of A. (c) A is true but R is false. (d) A is false but R is true. Assertion (A) :The equation of the line passing through the point(1,2) and perpendicular to the line $x + y + 1 = 0$ is $y - x + 1 = 0$ Reason (R) :slope of the line perpendicular to the line $x + y + 1 = 0$ is 1	1
20	Assertion (A):Let $A = \{ 1,3,4,\{\phi, 5\}, 6\}$ then, $\{\{\phi, 5\}\} \subset A$ Reason (R): If a is an element of any set A then $a \subset A$	1
	SECTION B [This section comprises of very short answer type questions (VSA) of	

	2 marks each]	
21	Insert 5 geometric means between $\frac{32}{9}$ and $\frac{81}{2}$.	2
22	Name the type of triangle formed, with the given coordinates (0,1,2), (2, - 1, 3) and (1, - 3, 1)	2
23	Find the value of $9^{1/3} \cdot 9^{1/9} \cdot 9^{1/27} \cdot \dots \infty$.	2
24	Let $A = \{1, 2, 3, \dots, 14\}$. Define a relation on a set A by $R = \{(x, y): 3x - y = 0, x, y \in A\}$. Depict the relationship using an arrow diagram. Write down its Co-domain and range. OR Define a relation R on the set of Natural Numbers N by $R = \{(x, y): y = x + 5, x \text{ is a natural number less than } 4, x, y \in N\}$. Depict the relationship using Roster Form. Also write the domain and range of R.	2
25	If the three points (h, 0), (a, b), (0, k) lie on a line, show that $\frac{a}{h} + \frac{b}{k} = 1$ OR Find the equation of the line passing through the point (1,2) and making angle of 30 degree with y- axis.	2
	SECTION C [This section comprises of short answer type questions (SA) of 3 marks each]	
26	If the intercept of a line between the coordinate axes is divided by the point (- 5, 4) in the ratio 1:2, find the equation of the line.	3
27	Using the concept of G.P., express $7.2\overline{53}$ as a rational number. OR Find the sum of n terms of $0.6 + 0.66 + 0.666 + \dots$.	3
28	The letters of the word 'ZENITH' are written in all possible orders and these words are written as in dictionary. Find the rank of the word 'SERIES'. OR In how many ways can the letters of the word 'INTERMEDIATE' be arranged so that (i) the vowels always occupy even places?	3

	(ii) the relative order of vowels and consonants do not alter?																			
29	Find the equation of the set of points P such that $PA^2 + PB^2 = k^2$, where k is a constant A(1,2,3) and B(2,-3,3). OR If P (x,y,z),A(2,5,8) and B(3,7,2) are the points ,such that $AP =BP$. Find the relation between x,y and z.	3																		
30	Verify $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$ if $A= \{1, 2, 3, 4\}$, $B= \{2, 4, 6, 8\}$ and $C=\{2, 3, 6, 5, 7\}$	3																		
31	For the given data,Find the median and the mean deviation from the med <table border="1"><tr><td>Time taken (in minutes)</td><td>10</td><td>15</td><td>20</td><td>25</td><td>30</td><td>35</td><td>40</td><td>45</td></tr><tr><td>Number of students</td><td>7</td><td>3</td><td>8</td><td>5</td><td>6</td><td>8</td><td>4</td><td>9</td></tr></table>	Time taken (in minutes)	10	15	20	25	30	35	40	45	Number of students	7	3	8	5	6	8	4	9	3
Time taken (in minutes)	10	15	20	25	30	35	40	45												
Number of students	7	3	8	5	6	8	4	9												
	SECTION D [This section comprises of long answer type questions (LA) of 5 marks each]																			
32	Two consecutive sides of a parallelogram are $4x + 5y = 0$ and $7x + 2y = 0$. If the equation of one diagonal is $11x + 7y = 9$, find the equation of the other diagonal. Or The equation of the base BC of an equilateral triangle is $x + y - 2 = 0$ and the opposite vertex A has coordinates (2, - 1) Then find the equation of the altitude from vertex A to the base and also the length of the altitude from A to the base BC.	5																		
33 (i)	A committee of 5 is to be formed out of 6 gents and 4 ladies. In how many ways this can be done, when (i) at least 2 ladies are included? (ii) at most 2 ladies are included?	4																		
(ii)	How many triangles can be obtained by joining 12 points , five of which are collinear?	1																		
34	If three numbers are in G.P. and their sum is 21 while their product is 216. Find the numbers. OR If The A.M. of two positive numbers a and b ($a > b$) is twice their geometric mean. Prove that $a: b = (2 + \sqrt{3}: 2 - \sqrt{3})$.	5																		
35	Write the domain and range of the following functions defined on the	5																		

	set of Real Numbers (i) $f(x) = 2 - x - 5$ (ii) $g(x) = \sqrt{x - [x]}$	
	SECTION E-CASE BASED QUESTION [This section comprises of 3 case - study/passage based questions of 4 marks each with sub parts. The first two case study questions have three sub parts (a), (b), (c) of marks 1,1,2 respectively. The third case study question has two sub parts of 2 marks each.]	
36	Read the following passage and answer the questions given below.  A survey is conducted on 100 students in a school to find out the language choices of students. 18 students choose English only, 23 English but not Hindi ,8 English and German , 26 English ,48 German , 8 German and Hindi. 24 students did not choose any language,Find (a) The number of students studying at least one of the languages . (b) The number of students studying Hindi and English (c) The number of students studying Hindi OR The number of students studying Hindi and German but not English	
37	A school wants to form a cricket team of 11 players from 15 available students. (a) In how many ways can the team be selected? (b) If one student is the captain and must be included, in how many ways can the team be chosen? (c) If 2 students refuse to play together, in how many ways can the team be formed? OR	

	If a captain and a vice-captain must be chosen separately from the 11 players, in how many ways can this be done?																
38	The given data shows the number of persons in the given age group , who visited a particular city for a day trip. <table data-bbox="560 376 1061 472"> <tr> <th>Age</th><th>20-30</th><th>30-40</th><th>40-50</th><th>50-60</th><th>60-70</th><th>70-80</th><th>80-90</th></tr> <tr> <td>No. Of Persons</td><td>3</td><td>6</td><td>13</td><td>15</td><td>14</td><td>5</td><td>4</td></tr> </table> a) Calculate the mean b) Calculate the variance.	Age	20-30	30-40	40-50	50-60	60-70	70-80	80-90	No. Of Persons	3	6	13	15	14	5	4
Age	20-30	30-40	40-50	50-60	60-70	70-80	80-90										
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