

SAMPLE QUESTION PAPER
CLASS XI (2026-27)
MATHEMATICS

Time: 3 hours

M.M: 80

General instructions

1. This question paper contains 38 questions and 6 printed pages.
2. This Question paper contains - five sections A, B, C, D and E. Each section is compulsory. However, there are internal choices in some questions.
3. Section A has 18 MCQ's and 02 Assertion-Reason based questions of 1 mark each.
4. Section B has 5 Very Short Answer (VSA)-type questions of 2 marks each.
5. Section C has 6 Short Answer (SA)-type questions of 3 marks each.
6. Section D has 4 Long Answer (LA)-type questions of 5 marks each.
7. Section E has 3 source based/case based/passage based/integrated units of assessment of 4 marks each with sub parts.

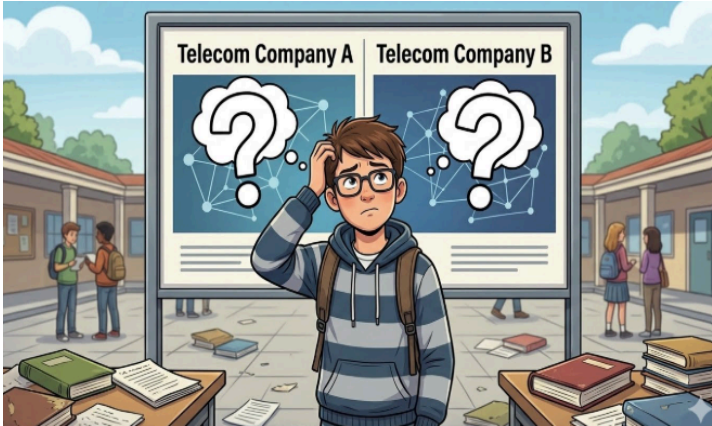
S.No.	Section -A (This section comprises of 20 Multiple choice questions (MCQs) of 1 mark each.)	Marks
1	If $A = [1, 20]$ and $B = [15, 30]$, then $A - B$ is A) (1,15) B) [1,15] C) (1,15} D) [1,15]	1
2	Let $z_1 = 2 - 3i$ and $z_2 = -1 + 2i$, then the quadrant of Argand plane in which $2z_1 - 3z_2$ lies is A) I B) II C) III D) IV	1
3	The standard deviation of ten observations is 5 . If 7 is added to each observation then new variance is A) 5 B) 25 C) 35 D) 144	1
4	If $P(n,r) = 24 C(n,r)$ then possible value(s) of r is(are) A) 3 B) 4 C) 3 or 4 D) 5	1
5	If A and B are two sets such that $A \subset B$, then $A' \cup B =$ A) ϕ B) A' C) U D) B	1
6	If $7^{1-2x} + 49^x = m$, then minimum value of m is A) $\sqrt{7}$ B) 7 C) $2\sqrt{7}$ D) $\frac{\sqrt{7}}{2}$	1
7	$\lim_{x \rightarrow 1} \frac{(\sqrt{x}-1)(2x-3)}{2x^2+x-3}$ is equal to A) 1 B) 1/10 C) -1/10 D) -1	1
8	If set $A = \{x : x^2 + 5 x + 6 = 0, x \in R\}$, number of subsets of A are A) 4 B) 16 C) 15 D) 1	1

9	The value of $(i^{2026})^{2027}$ is: A) i B) $-i$ C) 1 D) -1	1
10	The intercept form of the line $x \sin 2\theta + y \cos \theta = \sin \theta$ is A) $\frac{x}{(\sec \theta)/2} + \frac{y}{\tan \theta} = 1$ B) $\frac{2x}{\sec \theta} - \frac{y}{\tan \theta} = 1$ C) $\frac{x}{\sec \theta} + \frac{y}{\cot \theta} = 1$ D) $\frac{x}{(\sec \theta)/2} + \frac{y}{(\cot \theta)/2} = 1$	1
11	The number of diagonals of a decagon is A) 20 B) 30 C) 35 D) 40	1
12	The length of transverse axis of the hyperbola is $49y^2 - 16x^2 = 784$ is A) 32 B) 16 C) 14 D) 8	1
13	If $R = \{(x, y): x, y \in Z \text{ and } y = 2x - 3\}$ be a relation, then value(s) of b for which $(3, b^2) \in R$ is/are A) $\sqrt{3}$ B) $\sqrt{3}, -\sqrt{3}$ C) $-\sqrt{3}$ D) No such value exists	1
14	A person is having a gift card from which he can buy 2 kitchen items and 1 electronic gadget out of 15 kitchen items and 22 electronic gadgets available in the store. The number of ways of selecting items is A) 2210 B) 2310 C) 2450 D) 2640	1
15	The angle between the two straight lines $y = (2 - \sqrt{3})x + 5$ and $y = (2 + \sqrt{3})x - 7$ is A) 60° B) 45° C) 30° D) 15°	1
16	If $-3\sin A + 4\sin^3 A = \sin \alpha$, then $A =$ A) 3α B) $\frac{\alpha}{3}$ C) $-\frac{\alpha}{3}$ D) $\frac{\alpha}{2}$	1
17	A sequence is defined as $a_1 = -1$, $a_n = \frac{a_{n-1}}{n}$, for $n > 1$. Then a_n in terms of n is : A) $-\frac{1}{n}$ B) $-\frac{1}{n!}$ C) $\frac{(-1)^n}{n!}$ D) $(-1)^n n!$	1
18	The image of the point $(-7, 5, 6)$ with respect to xy plane is A) $(-7, -5, -6)$ B) $(7, -5, -6)$ C) $(7, -5, 6)$ D) $(-7, 5, -6)$	1
Q19 -20 are Assertion-Reasoning based questions. ASSERTION- REASONING QUESTION: Choose one of the following for answering: 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.		
19	Assertion(A): If $\sin A + \sin B + \sin C = -3$, then $\cos A + \cos B + \cos C = 0$ Reason(R): The sine of any real angle lies from -1 to 1.	1
20	Assertion(A): $8^{n+1} - 7n - 7$ is always divisible by 49.	1

	Reason(R) : $8^n = (1 + 7)^n$	
Section B (This section comprises of 5 Very short answer (VSA) type questions of 2 marks each.)		
21	Evaluate $\lim_{x \rightarrow \frac{\pi}{4}} \frac{\sin x - \cos x}{x - \frac{\pi}{4}}$	2
22	Find a point in yz-plane which is equidistant from the points A (3 ,0 ,0), B(0 ,-1 ,0) and C(0,0,2).	2
23	Let $f(x + \frac{1}{x}) = (x^2 + \frac{1}{x^2})$ for all $x \in R - \{0\}$,then write an expression for $f(x)$ and determine its range.	2
24	A) Find the number of words (with or without meaning) that can be formed using all the letters of the word “REMAINDER” in which all the vowels occur together. OR B) In how many ways can 6 boys and 5 girls be seated in a row so that girls occupy even places.	2
25	A) An urn contains 7 white balls, 5 Blue balls and 3 Red balls. If three balls are selected at random then find the Probability of selecting at most 2 blue balls. OR B) If A and B are exhaustive events such that $P(A) = 0.83$ and $P(B) = 0.29$ then find $P(A \cap B)$.	2
Section C (This section comprises of 6 Short answer (SA)type questions of 3 marks each.)		
26	Find the coefficient of x^3 in the product of $(2 + x)^5(2x - 1)^4$.	3
27	A) An electric vehicle (EV) is traveling along a straight-line path defined by the equation $x + y = 4$. At a certain instant, the driver notices the battery is running low. A GPS search reveals two nearby charging stations, P and Q. To reach station P, the vehicle must continue along its current path for 1km, turn to the right, and proceed in a straight line to the coordinates (4, 6). To reach station Q, the vehicle must continue along its current path for 2 km,turn to the left, and proceed in a straight line to the coordinates (-2, 2). From which station he must recharge the vehicle and why? OR B) In India, cattle ear tagging is a mandatory part of the National Digital Livestock Mission (NDLM) and the National Animal Disease Control Programme (NADCP). A cow with an ear tag is drinking water from a pond. At a specific instant, the ear tag is located at the position (3,8). Assuming the water surface acts as a plane mirror , find the coordinates of the image of the ear tag with respect to the line $x + 3y = 7$, lying on the water surface.	3
28	If $\cos x = \frac{-3}{5}$, x lies in the II Quadrant ,find the values of $\sin 2x$ and $\sin \frac{x}{2}$.	3
29	Let $z_1 = 1 - 3i$, $z_2 = 3i + 1$ and , $z_3 = 2 + i$.	3

	(i) Verify Associative Law for Multiplication. (ii) Find Additive inverse of $z_1 + 2z_2 - z_3$.																															
30	A) If $U = \{1, 2, 3, 4, 5, 6, \dots, 40\}$, $A = \{x: x \text{ divisible by } 2 \text{ and } 3\}$ $B = \{x: x = n^2, n \in \mathbb{N}\}$, then verify that $(A \cap B) \cup (A - B) = A$ OR B) For any two sets A and B prove that if $A \cup B = A \cap B$, then $A = B$	3																														
31	A farmer wishes to install 2 hand pumps in his field for watering. The farmer moves in the field while watering in such a way that the sum of distances of the farmer from each handpump is always 26m. Also, the distance between the hand pumps is 10 m. (Assuming that both handpumps lie on x-axis). Find the equation of the path traced by farmer.	3																														
Section D (This section comprises Of 4 Long answer (LA) type questions of 5 marks each.)																																
32	A) If $\sin 5A = p \sin A + q \sin^3 A + r \sin^5 A$, find $p - q + r$. OR B) Find the value of $\cos 10^\circ \cos 50^\circ \cos 60^\circ \cos 70^\circ$.	5																														
33	The Government of India injects an economic stimulus package of ₹10,000 crores into the economy to boost infrastructure. According to fiscal data, corporate bodies and citizens who receive this money spend exactly 80% of it on domestic goods, services, and wages. The remaining 20% is saved. The recipients of that 80% spending, in turn, also spend 80% of their new income and save the rest. This chain reaction of spending and re-spending continues indefinitely throughout the economy. Find the total amount saved by corporate bodies and citizens after the 10th round. Also, calculate the total increase in economic activity by continuous spending rounds.	5																														
34	A) Calculate mean, variance and Standard Deviation for the following distribution. <table border="1"><tr><td>Class</td><td>30 - 40</td><td>40 - 50</td><td>50 - 60</td><td>60 - 70</td><td>70 - 80</td><td>80 - 90</td><td>90 - 100</td></tr><tr><td>Frequency</td><td>3</td><td>7</td><td>12</td><td>15</td><td>8</td><td>3</td><td>2</td></tr></table> OR B) Calculate the mean deviation about median for the following data: <table border="1"><tr><td>Class</td><td>0 - 10</td><td>10 - 20</td><td>20 - 30</td><td>30 - 40</td><td>40 - 50</td><td>50 - 60</td></tr><tr><td>Frequency</td><td>6</td><td>7</td><td>15</td><td>16</td><td>4</td><td>2</td></tr></table>	Class	30 - 40	40 - 50	50 - 60	60 - 70	70 - 80	80 - 90	90 - 100	Frequency	3	7	12	15	8	3	2	Class	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	Frequency	6	7	15	16	4	2	5
Class	30 - 40	40 - 50	50 - 60	60 - 70	70 - 80	80 - 90	90 - 100																									
Frequency	3	7	12	15	8	3	2																									
Class	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60																										
Frequency	6	7	15	16	4	2																										

35	Using first principle, find the derivative of $f(x) = \frac{3x-5}{5x-3}$ and Also, verify it using the quotient rule.	5
Section E (This section comprises of 3 case study based questions of 4 marks each.)		
36	A preschool educational toy company is manufacturing Geometric blocks for young children .One specific type has different isosceles triangle shaped blocks with equal sides 4cm each but different heights.The height (altitude drawn to the third side) varies and is designated as x cm.  Based on the above information, answer the following: (i) Express the perimeter of one block face, ($P(x)$), as a function of x. (1) (ii) Express the area of the block face, ($A(x)$), as a function of x. (1) (iii)a) Find the domain of the perimeter function $P(x)$ based on physical toy constraints. Also, if $m < P(x) < n$. Find the value of m. (2) OR (iii) b)Find the domain of the area function $A(x)$.Also, find the area of the block when height is 2cm . (2)	4
37	During a 2- week period(14 days) Arjika took her umbrella with her on 8 days.It rained on 9 days.Arjika took her umbrella on 5 of the days when it rained.Let A represents the event that Arjika carries an umbrella and R represents an event that it rains. 	4

	If a day from 2 week period is chosen at random then (i) Find $P(A)$ and $P(R)$. (1) (ii) Find the probability that Arjika does not take her umbrella and it rains. (1) (iii) a) Find the probability that Arjika does not take her umbrella and it does not rain. (2) OR (iii) b) Find the probability that it rains and Arjika does not take her umbrella or Arjika takes her umbrella but it does not rain. (2)	
38	Telecom company A and B offers a monthly student data plan. Company A and B costs a flat fee of ₹199 and ₹164 per month respectively. This base plan includes a set amount of high-speed data. If a student exceeds their high-speed data limit, the company automatically switches to an overage billing rate, charging an extra ₹15 by company A and ₹17 by Company B for every gigabyte (GB) used over the limit. Rohan wants to select one of the plans. He has set a strict monthly budget for himself and wants his total phone bill to be at most ₹334 per month. Let x represent the number of extra gigabytes (GB) Rohan uses beyond his base plan limit.  (i) Formulate the linear inequality for the plan purchased from telecom company A and B. (2) (ii) Which telecom company should Rohan select and why? (2)	4