

MATHEMATICS STANDARD – Code No.041
SAMPLE QUESTION PAPER
CLASS – X (2025-26)

Maximum Marks: 80

Time: 3 hours

General Instructions:

Read the following instructions carefully and follow them:

1. This question paper contains 38 questions. All Questions are compulsory.
2. This Question Paper is divided into 5 Sections A, B, C, D and E.
3. In Section A, Question numbers 1-18 are multiple choice questions (MCQs) and questions no. 19 and 20 are Assertion- Reason based questions of 1 mark each.
4. In Section B, Question numbers 21-25 are very short answer (VSA) type questions, carrying 02 marks each.
5. In Section C, Question numbers 26-31 are short answer (SA) type questions, carrying 03 marks each.
6. In Section D, Question numbers 32-35 are long answer (LA) type questions, carrying 05 marks each.
7. In Section E, Question numbers 36-38 are case study-based questions carrying 4 marks each with sub parts of the values of 1, 1 and 2 marks each respectively.
8. There is no overall choice. However, an internal choice in 2 questions of Section B, 2 questions of Section C and 2 questions of Section D has been provided. An internal choice has been provided in all the 2 marks questions of Section E.
9. Draw neat and clean figures wherever required. Take $\pi = \frac{22}{7}$ wherever required if not stated.
10. Use of calculators is not allowed.

(Section A) Section A consists of 20 questions of 1 mark each.		
Q.No.	Questions	Marks
1.	If $a = 2^2 \times 3^x$, $b = 2^2 \times 3 \times 5$, $c = 2^2 \times 3 \times 7$ and LCM $(a, b, c) = 3780$, then x is equal to (A) 1 (B) 2 (C) 3 (D) 0	1
2.	The shortest distance (in units) of the point (2,3) from y-axis is (A) 2 (B) 3 (C) 5 (D) 1	1
3.	If the lines given by $3x + 2ky = 2$ and $2x + 5y + 1 = 0$ are not parallel, then k has to be (A) $\frac{15}{4}$ (B) $\neq \frac{15}{4}$ (C) any rational number (D) any rational number having 4 as denominator	1

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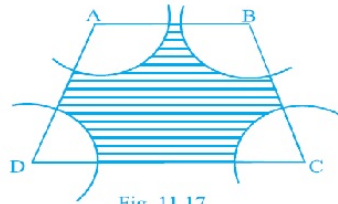
Page 1 of 8

4.	If the sum of the roots of the equation $kx^2 + 2x + 3k = 0$ is equal to their product then the value of k is (a) $\frac{1}{3}$ (b) $-\frac{1}{3}$ (c) $\frac{2}{3}$ (d) $-\frac{2}{3}$	1
5.	If $\sec\theta + \tan\theta = x$, then $\sec\theta - \tan\theta$ will be (A) x (B) x^2 (C) $\frac{2}{x}$ (D) $\frac{1}{x}$	1
6.	Which one of the following is not a quadratic equation? (A) $(x+2)^2 = 2(x+3)$ (B) $x^2 + 3x = (-1)(1-3x)^2$ (C) $x^3 - x^2 + 2x + 1 = (x+1)^3$ (D) $(x+2)(x+1) = x^2 + 2x + 3$	1
7.	Given below is the picture of the Olympic rings made by taking five congruent circles of radius 1cm each, intersecting in such a way that the chord formed by joining the point of intersection of two circles is also of length 1cm. Total area of all the dotted regions (assuming the thickness of the rings to be negligible) is  (A) $4\left[\frac{\pi}{12} - \frac{\sqrt{3}}{4}\right] \text{ cm}^2$ (B) $\left[\frac{\pi}{6} - \frac{\sqrt{3}}{4}\right] \text{ cm}^2$ (C) $4\left[\frac{\pi}{6} - \frac{\sqrt{3}}{4}\right] \text{ cm}^2$ (D) $8\left[\frac{\pi}{6} - \frac{\sqrt{3}}{4}\right] \text{ cm}^2$ For Visually Impaired candidates The area of the circle that can be inscribed in a square of 6 cm is (A) $36\pi \text{ cm}^2$ (B) $18\pi \text{ cm}^2$ (C) $12\pi \text{ cm}^2$ (D) $9\pi \text{ cm}^2$	1
8.	A pair of dice is tossed. The probability of not getting the sum eight is (A) $\frac{5}{36}$ (B) $\frac{31}{36}$ (C) $\frac{5}{18}$ (D) $\frac{5}{9}$	1
9.	If $2\sin 5x = \sqrt{3}$, $0^\circ \leq x \leq 90^\circ$, then x is equal to (A) 10° (B) 12° (C) 20° (D) 50°	1
10.	The sum of two numbers is 1215 and their HCF is 81, then the possible pairs of such numbers are (A) 2 (B) 3 (C) 4 (D) 5	1

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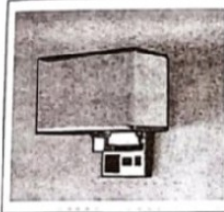
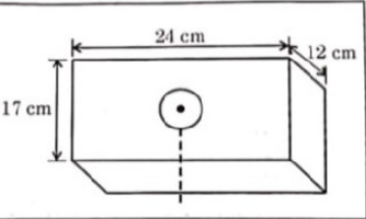
11.	If the area of the base of a right circular cone is 51cm^2 and it's volume is 85cm^3 , then the height of the cone is given as (A) $\frac{5}{6}\text{cm}$ (B) $\frac{5}{3}\text{cm}$ (C) $\frac{5}{2}\text{cm}$ (D) 5cm	1
12.	If zeroes of the quadratic polynomial $ax^2 + bx + c$ ($a, c \neq 0$) are equal, then (A) c and b must have opposite signs (B) c and a must have opposite signs (C) c and b must have same signs (D) c and a must have same signs	1
13.	The area (in cm^2) of a sector of a circle of radius 21cm cut off by an arc of length 22cm is (A) 441 (B) 321 (C) 231 (D) 221	1
14.	If the point $C(k, 4)$ divides the join of the points $A(2, 6)$ and $B(5, 1)$ in the ratio $2 : 3$ then the value of k is [CBSE 2013C] (a) 16 (b) $\frac{28}{5}$ (c) $\frac{16}{5}$ (d) $\frac{8}{5}$	1
15.	If the probability of the letter chosen at random from the letters of the word "Mathematics" to be a vowel is $\frac{2}{2x+1}$, then x is equal to (A) $\frac{4}{11}$ (B) $\frac{9}{4}$ (C) $\frac{11}{4}$ (D) $\frac{4}{9}$	1
16.	The points $A(9,0)$, $B(9, -6)$, $C(-9,0)$ and $D(-9,6)$ are the vertices of a (A) Square (B) Rectangle (C) Parallelogram (D) Trapezium	1
17.	The median of a set of 9 distinct observation is 20.5. If each of the observations of a set is increased by 2, then the median of a new set (A) is increased by 2 (B) is decreased by 2 (C) is two times the original number (D) Remains same as that of original observations	1
18.	The length of a tangent drawn to a circle of radius 9cm from a point at a distance of 41cm from the centre of the circle is (A) 40cm (B) 9cm (C) 41cm (D) 50cm	1
	DIRECTIONS: In the question number 19 and 20, a statement of Assertion (A) is followed by a statement of Reason (R) . Choose the correct option: (A) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A) (B) Both assertion (A) and reason (R) are true and reason (R) is not the explanation of assertion (A) (C) Assertion (A) is true but reason (R) is false. (D) Assertion (A) is false but reason (R) is true.	

19.	Assertion (A): The number 5^n cannot end with the digit 0, where n is a natural number Reason (R): A number ends with 0, if its prime factorization contains both 2 and 5	1
20.	Assertion (A): If $\cos A + \cos^2 A = 1$, then $\sin^2 A + \sin^4 A = 1$ Reason (R): $\sin^2 A + \cos^2 A = 1$	1
(Section – B) Section B consists of 5 questions of 2 marks each.		
21.(A)	If $\cos \theta = 0.6$, show that $(5\sin \theta - 3\tan \theta) = 0$.	2
(B)	OR If $\tan \theta = \frac{a}{b}$, show that $\frac{(a\sin \theta - b\cos \theta)}{(a\sin \theta + b\cos \theta)} = \frac{(a^2 - b^2)}{(a^2 + b^2)}$.	
22.	If $\sin(A + B) = 1$ and $\cos(A - B) = \frac{\sqrt{3}}{2}$, $0^\circ < A, B < 90^\circ$, find the measure of angles A and B .	2
23.	A toy is in the shape of a cone mounted on a hemisphere of same base radius. If the volume of the toy is 231 cm^3 and its diameter is 7 cm, find the height of the toy.	2
24. (A)	A horse, a cow and a goat are tied, each by ropes of length 14m, at the corners A, B and C respectively, of a grassy triangular field ABC with sides of lengths 35m, 40m and 50 m. Find the area of grass field that can be grazed by them.	2
(B)	OR Find the area of the major segment (in terms of π) of a circle of radius 5cm, formed by a chord subtending an angle of 90° at the centre.	
25.	If the roots of the equation $(c^2 - ab)x^2 - 2(a^2 - bc)x + (b^2 - ac) = 0$ are real and equal, show that either $a = 0$ or $(a^3 + b^3 + c^3) = 3abc$. [CBSE 2017]	2

(Section – C) Section C consists of 6 questions of 3 marks each.		
26.	In Fig. 11.17, ABCD is a trapezium with $AB \parallel DC$, $AB = 18$ cm, $DC = 32$ cm and distance between AB and $DC = 14$ cm. If arcs of equal radii 7 cm with centres A, B, C and D have been drawn, then find the area of the shaded region of the figure.  Fig. 11.17	3
27.	In a workshop, the number of teachers of English, Hindi and Science are 36, 60 and 84 respectively. Find the minimum number of rooms required, if in each room the same number of teachers are to be seated and all of them being of the same subject.	3
28.	Find the zeroes of the quadratic polynomial $2x^2 - (1 + 2\sqrt{2})x + \sqrt{2}$ and verify the relationship between the zeroes and coefficients of the polynomial.	3
29.	If $\sin\theta + \cos\theta = \sqrt{3}$, then prove that $\tan\theta + \cot\theta = 1$ OR Prove that $\frac{\cos A - \sin A + 1}{\cos A + \sin A - 1} = \operatorname{cosec} A + \cot A$	3
30.	On a particular day, Vidhi and Unnati couldn't decide on who would get to drive the car. They had one coin each and flipped their coin exactly three times. The following was agreed upon: 1. If Vidhi gets two heads in a row, she would drive the car 2. If Unnati gets a head immediately followed by a tail, she would drive the car. Who has greater probability to drive the car that day? Justify your answer.	3
31.(A)	The monthly income of Aryan and Babban are in the ratio 3:4 and their monthly expenditures are in ratio 5:7. If each saves ₹ 15,000 per month, find their monthly incomes. OR (B) Solve the following system of equations graphically: $2x + y = 6$, $2x - y - 2 = 0$. Find the area of the triangle so formed by two lines and x-axis. For Visually Impaired candidates: Five years hence, fathers age will be three times the age of son. Five years ago, father was seven times as old as his son. Find their present ages.	3

(Section – D)
Section D consists of 4 questions of 5 marks each

32.	A train travels at a certain average speed for a distance of 63km and then travels at a distance of 72km at an average speed of 6km/hr more than its original speed. If it takes 3 hours to complete the total journey, what is the original average speed?	5														
33.	<i>Rahul, an engineering student, prepared a model shaped like a cylinder with two cones attached at its two ends. The diameter of the model is 3 cm and its length is 12 cm. If each conical part has a height of 2 cm, find the (i) volume of air contained in Rahul's model (assume the outer and inner dimensions of the model to be nearly the same), (ii) cost of painting the outer surface of the model at ₹ 12.50 per cm².</i>	5														
34.(A)	From a solid right circular cone, whose height is 6cm and radius of base is 12cm, a right circular cylindrical cavity of height 3cm and radius 4cm is hollowed out such that bases of cone and cylinder form concentric circles. Find the surface area of the remaining solid in terms of π . OR	5														
(B)	An empty cone of radius 3cm and height 12cm is filled with ice-cream such that the lower part of the cone which is $(\frac{1}{6})^{\text{th}}$ of the volume of the cone is unfilled (empty) but a hemisphere is formed on the top. Find the volume of the ice-cream.															
35.(A)	If the mode of the following distribution is 55, then find the value of x . Hence, find the mean. <table border="1" style="margin: 10px auto;"><tr><td>Class Interval</td><td>0 – 15</td><td>15 – 30</td><td>30 – 45</td><td>45 – 60</td><td>60 – 75</td><td>75 – 90</td></tr><tr><td>Frequency</td><td>10</td><td>7</td><td>x</td><td>15</td><td>10</td><td>12</td></tr></table> OR	Class Interval	0 – 15	15 – 30	30 – 45	45 – 60	60 – 75	75 – 90	Frequency	10	7	x	15	10	12	5
Class Interval	0 – 15	15 – 30	30 – 45	45 – 60	60 – 75	75 – 90										
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(B)	A survey regarding heights (in cm) of 51 girls of class X of a school was conducted and the following data was obtained: <table border="1" style="margin: 10px auto;"><tr><th>Heights (in cm)</th><th>Number of girls</th></tr><tr><td>less than 140</td><td>04</td></tr><tr><td>less than 145</td><td>11</td></tr><tr><td>less than 150</td><td>29</td></tr><tr><td>less than 155</td><td>40</td></tr><tr><td>less than 160</td><td>46</td></tr><tr><td>less than 165</td><td>51</td></tr></table> Find the median height of girls. If mode of the above distribution is 148.05, find the mean using empirical formula.	Heights (in cm)	Number of girls	less than 140	04	less than 145	11	less than 150	29	less than 155	40	less than 160	46	less than 165	51	
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(Section – E) Section E consists of 3 case study-based questions of 4 marks each.		
36.	In a class, the teacher asks every student to write an example of A.P. Two boys Aryan and Roshan writes the progression as $-5, -2, 1, 4, \dots$ and $187, 184, 181, \dots$ respectively. Now the teacher asks his various students the following questions on progression. Help the students to find answers for the following: - Find the sum of the common difference of two progressions. - Find the 34th term of progression written by Roshan. (A) Find the sum of first 10 terms of the progression written by Aryan. OR (B) Which term of the progressions will have the same value?	1 1 2 2
37.	38. A wall mounted lamp, made of fabric, is shown below. Lamp has cuboidal shape, open from top and bottom. A spherical bulb of diameter 7 cm is latched with a very thin rod. (Ignore the rod while making calculations.)   Dimensions of the cuboid are $24 \text{ cm} \times 12 \text{ cm} \times 17 \text{ cm}$. - Find the surface area of the bulb. - What could be the maximum diameter of the bulb if at least 1 cm space is left from each side? (a) Find the area of the fabric used if there is a fold of 2 cm on top and bottom edges. OR (b) Find the space available inside the lamp.	1 1 2 2

38.	India gate (formerly known as All India war memorial) is located near Karthavya path. (formerly Rajpath) at New Delhi. It stands as a memorial to 74187 soldiers of Indian Army, who gave their life in the first world war. This 42m tall structure was designed by Sir Edwin Lutyens in the style of Roman triumphal arches. A student Shreya of height 1 m visited India Gate as a part of her study tour.		
	i. What is the angle of elevation from Shreya's eye to the top of India Gate, if she is standing at a distance of 41m away from the India Gate? ii. If Shreya observes the angle of elevation from her eye to the top of India Gate to be 60°, then how far is she standing from the base of the India Gate? iii. (A) If the angle of elevation from Shreya's eye changes from 45° to 30°, when she moves some distance back from the original position. Find the distance she moves back.		1 1 2
	OR (B) If Shreya moves to a point which is at a distance of $\frac{41}{\sqrt{3}}$ m from the India Gate, then find the angle of elevation made by her eye to the top of India Gate.		2

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