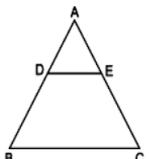
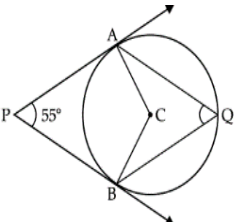
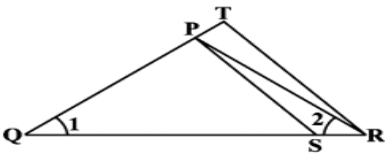
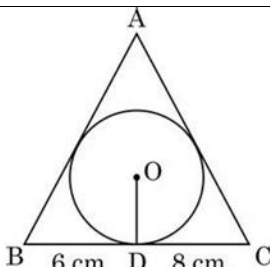
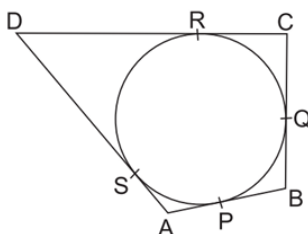
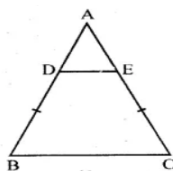
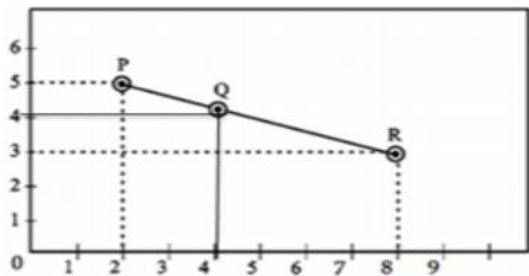


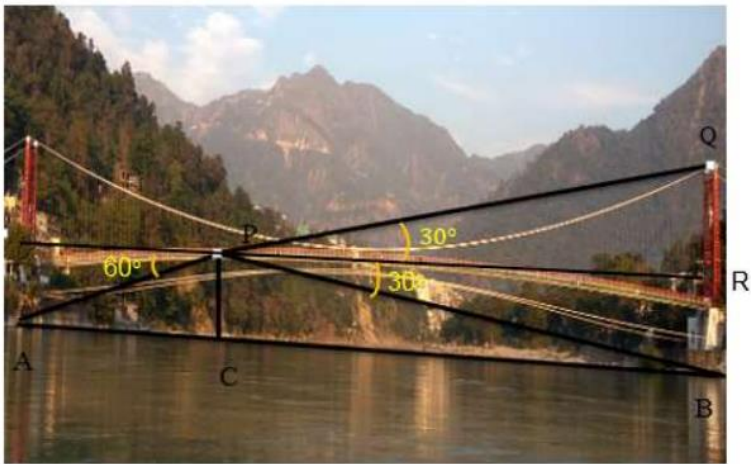

<p align="center"><b><u>KENDRIYA VIDYALAYA SANGATHAN, MUMBAI REGION</u></b>  <b><u>SESSION: 2025 - 26</u></b>  <b><u>PREBOARD I EXAMINATION</u></b>  <b><u>MATHEMATICS (STANDARD) – 041</u></b>  <b><u>CLASS - X</u></b>  <b><u>Maximum Marks: 80</u></b> <b><u>Time: 3 hours</u></b></p>		
<p><b><u>General Instructions:</u></b>  <b>Read the following instructions carefully and follow them:</b>  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 <math>\pi = 22/7</math>  10. Use of calculators is not allowed. wherever required if not stated.</p>		
<b>SECTION A</b>		
1	The ratio of LCM and HCF of 2 and 4 is (a). 2:4      (b) 2:1      (c) 2:2      (d) 3:4	1
2	If $\alpha$ and $\beta$ are the zeros of a polynomial $f(x) = px^2 - 2x + 3p$ and $\alpha + \beta = \alpha\beta$ , then p is (a)-2/3      (b) 2/3      (c) 1/3      (d) -1/3	1
3	For what value of k will the pair of linear equations $x - 2y = 3$ and $-3x + ky = -9$ have infinitely many solutions? (a) (-6)      (b) -3      (c) 3      (d) 6	1
4	If one root of equation $4x^2 - 2x + k - 4 = 0$ is reciprocal of the other. Then find the value of k. (a) -8      (b) 8      (c) -4      (d) 4	1
5	If k, $2k - 1$ and $2k + 1$ are three consecutive terms of an A.P., then the value of k is (a) 2      (b) -3      (c) 3      (d) 5	1
6	The distance of the point (-6, 8) from x-axis is (a) 6 units      (b) -6 units      (c) 8 units      (d) 10 units	1
7	The coordinates of a point P, where PQ is the diameter of a circle whose center is (2, -3) and Q is (1, 4) is: (a) (3, -10)      (b) (2, -10)      (c) (-3, 10)      (d) (-2, 10).	1

8	<p>In the <math>\triangle ABC</math>, D and E are points on side AB and AC respectively such that <math>DE \parallel BC</math>. If <math>AE = 2</math> cm, <math>AD = 3</math> cm and <math>BD = 4.5</math> cm, then CE equals</p> <p>(a) 1                      (b) 2                      (c) 3                      (d)</p>		1
9	<p>If <math>\triangle ABC</math> is right angled at C, then the value of <math>\sin (A + B)</math> is</p> <p>(a) 0                      (b) 1                      (c) <math>1/2</math>                      (d) <math>\sqrt{3}/2</math></p>		1
10	<p>A student uses a clinometer to measure the height of a flagpole. The angle of elevation from a point 75 m away from the pole is <math>30^\circ</math>. What is the height of the flagpole (in meters)?</p> <p>(a) <math>25\sqrt{3}</math>                      (b) <math>75\sqrt{3}</math>                      (c) 150                      (d) <math>50\sqrt{3}</math></p>		1
11	<p>If <math>2\sin^2 A - \cos^2 A = 2</math>, then A is:</p> <p>(a) <math>90^\circ</math>                      (b) <math>0^\circ</math>                      (c) <math>45^\circ</math>                      (d) <math>30^\circ</math></p>		1
12	<p>The area of a circle that can be inscribed in a square of side 6 cm is:</p> <p>(a) <math>36\pi \text{ cm}^2</math>                      (b) <math>18\pi \text{ cm}^2</math>                      (c) <math>9\pi \text{ cm}^2</math>                      (d) <math>12\pi \text{ cm}^2</math></p>		1
13	<p>In the given figure, PA and PB are tangents from external point P to a circle with centre C and Q is any point on the circle. Then the measure of <math>\angle AQB</math> is</p> <p>(a) <math>62\frac{1}{2}^\circ</math>                      (b) <math>55^\circ</math></p> <p>(c) <math>125^\circ</math>                      (d) <math>90^\circ</math></p>		1
14	<p>If the sum of the areas of two circles with radii <math>R_1</math> and <math>R_2</math> is equal to the area of a circle of radius R, then:</p> <p>(a) <math>R_1^2 + R_2^2 = R^2</math>                      (b) <math>R_1 + R_2 &lt; R</math>                      (c) <math>R_1 + R_2 = R</math>                      (d) <math>R_1 + R_2 &lt; R_2</math></p>		1
15	<p>The length of a tangent from a point A at a distance 5 cm from the centre of the circle is 4 cm. The radius of the circle is</p> <p>(a) 3 cm                      (b) 5 cm                      (c) 7 cm                      (d) 10 cm</p>		1
16	<p>What is the probability of getting 53 Mondays in a Leap year?</p> <p>(a) <math>1/7</math>                      (b) <math>1/5</math>                      (c) <math>2/7</math>                      (d) <math>3/5</math></p>		1
17	<p>Rahul is playing with two dice. what is the probability of getting not doublet?</p> <p>(a) <math>1/3</math>                      (b) <math>1/6</math>                      (c) <math>1/5</math>                      (d) <math>5/6</math></p>		1
18	<p>A card is drawn at random from a well-shuffled pack of 52 cards. The probability that the card drawn is not an ace is</p> <p>(a) <math>1/13</math>                      (b) <math>9/13</math>                      (c) <math>4/13</math>                      (d) <math>12/13</math></p>		1
	<p><b>DIRECTION:</b> In the question number 19 and 20, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct option</p> <p>(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A)</p> <p>(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).</p> <p>(c) Assertions (A) is true but reason (R) is false.</p> <p>(d) Assertions (A) is false but reason (R) is true.</p>		

19	<p><b>Assertion (A):</b> If the second term of an A.P., is 13 and the fifth term is 25, then its 7th term is 33.</p> <p><b>Reason (R):</b> If the common difference of an A.P is 5, then <math>a_{18} - a_{13}</math> is 25.</p>	1
20	<p><b>Assertion (A):</b> The radii of two cones are in the ratio 2 : 3 and their volumes in the ratio 1 : 3. Then the ratio of their heights is 3 : 2.</p> <p><b>Reason (R):</b> Volume of the cone = <math>\frac{1}{3} (\pi r^2 h)</math> .</p>	1
<b>SECTION B</b>		
21	Find HCF and LCM of 404 and 96 and verify that $\text{HCF} \times \text{LCM} = \text{Product of the two given numbers}$ .	2
22	<p>A ladder 15 m long just reaches the top of a vertical wall. If the ladder makes an angle of <math>60^\circ</math> with the wall, then find the height of the wall .</p> <p style="text-align: center;">OR</p> <p>Evaluate: <math>(5\sin^2 30 + \cos^2 45 + 4 \tan^2 60) / (2\sin^2 30 \cos^2 60 + \tan^2 45)</math></p>	2
23	<p>In the given figure, <math>QR / QS = QT / PR</math> and <math>\angle 1 = \angle 2</math>, Show that <math>\Delta PQS \sim \Delta TQR</math>.</p> 	2
24	A student draws tangents from an external point and measures its lengths, prove that the lengths of the tangents drawn from an external point to a circle are equal.	2
25	<p>A horse is placed for grazing inside a rectangular field 70 m by 52 m and is tethered to one corner by a rope 28 m long. On how much area can it graze?</p> <p style="text-align: center;">OR</p> <p>The length of the minute hand of a clock is 14 cm. Find the area swept by the minute hand in 5 minutes.</p>	2
<b>SECTION C</b>		
26	Prove that $\sqrt{5}$ is an irrational number.	3
27	<p>The relationship between the times <math>x</math> (in hours) of travel and the distances <math>y</math> covered (in kilometers) of the two cars is represented by the following equations</p> $2x + y = 6$ $2x - y - 2 = 0$ <p>Solve the following system of equations graphically and calculate the area of the triangle formed by these two lines and the <math>x</math>-axis.</p>	3
28	In Figure, a triangle ABC is drawn to circumscribe a circle of radius 4 cm such that the circle touches the side BC at point D, dividing BC into segments $BD = 6\text{cm}$ and $DC = 8\text{cm}$ . If the area of $\Delta ABC$ is $84 \text{ cm}^2$ , find the lengths of sides AB and AC.	3

	<div></div> <div><p style="text-align: center;"><b>OR</b></p></div> <div><p>A quadrilateral ABCD is drawn to circumscribe a circle, as shown in the given</p><p>Show that <math>AB+CD=AD+BC</math>.</p></div>													
29	<p>The area of a rectangular garden (in <math>m^2</math>) is given by <math>p(x) = 2x^2-x-6</math>, where <math>x</math> is its length (in m).</p> <p>(i) For which two values of <math>x</math> will the area be zero?</p> <p>(ii) Verify the relationship between the zeroes and the coefficients.</p>	3												
30	<p>Prove that: <math>(\sin A + \operatorname{cosec} A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A</math></p> <p style="text-align: center;"><b>OR</b></p> <p>If <math>x = p \sec \theta + q \tan \theta</math> and <math>y = p \tan \theta + q \sec \theta</math>, then prove that <math>x^2 - y^2 = p^2 - q^2</math></p>	3												
31	<p>A school's marks distribution is given below. Find the mode and suggest about student performance?</p> <table><tr><td>Marks</td><td>0-20</td><td>20-40</td><td>40-60</td><td>60-80</td><td>80-100</td></tr><tr><td>Number of Students</td><td>5</td><td>10</td><td>12</td><td>6</td><td>3</td></tr></table>	Marks	0-20	20-40	40-60	60-80	80-100	Number of Students	5	10	12	6	3	3
Marks	0-20	20-40	40-60	60-80	80-100									
Number of Students	5	10	12	6	3									
<p style="text-align: center;"><b>SECTION D</b></p>														
32	<p>Prove that if a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio</p> <p>Using the above result, prove the following.</p> <p>In the given figure, <math>DE \parallel BC</math> and <math>BD = CE</math>.</p> <p>Prove that <math>\triangle ABC</math> is an isosceles triangle.</p> <div></div>	5												
33	<p>The age of a man is twice the square of the age of his son. Eight years hence, the age of the man will be 4 years more than three times the age of his son. Find their present ages.</p>	5												
34	<p>A vessel full of water is in the form of an inverted cone of height 8 cm and the radius of its top, which is open, is 5 cm. 100 spherical lead balls are dropped into the vessel. One fourth of the water flows out of the vessel. Find the radius of a spherical ball.</p> <p style="text-align: center;"><b>OR</b></p> <p>A tent is in the shape of a cylinder surmounted by a conical top. If the height and radius of the cylindrical part are 3 m and 14 m respectively, and the total height of the tent is 13.5 m, find the area of the canvas required for making the tent, keeping a</p>	5												

	provision of $26 \text{ m}^2$ of canvas for stitching and wastage. Also, find the cost of the canvas to be purchased at the rate of ₹ 500 per $\text{m}^2$ .																																	
35	<p>The table below shows the distribution of marks obtained by the students in a mathematics test. Find the mean and median marks obtained by the student.</p> <table><tr><td>Marks Scored</td><td>20-60</td><td>60-100</td><td>100-140</td><td>140-180</td><td>180-220</td><td>220-260</td></tr><tr><td>Number of students</td><td>7</td><td>5</td><td>16</td><td>12</td><td>2</td><td>3</td></tr></table> <p style="text-align: center;"><b>OR</b></p> <p>The distribution below gives the marks of 100 students of a class, if the median marks are 24, find the frequencies <math>f_1</math> and <math>f_2</math>.</p> <table><tr><td>Marks</td><td>0-5</td><td>5-10</td><td>10-15</td><td>15-20</td><td>20-25</td><td>25-30</td><td>30-35</td><td>35-40</td></tr><tr><td>No. of students</td><td>4</td><td>6</td><td>10</td><td><math>f_1</math></td><td>25</td><td><math>f_2</math></td><td>18</td><td>5</td></tr></table>	Marks Scored	20-60	60-100	100-140	140-180	180-220	220-260	Number of students	7	5	16	12	2	3	Marks	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	No. of students	4	6	10	$f_1$	25	$f_2$	18	5	5
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No. of students	4	6	10	$f_1$	25	$f_2$	18	5																										
	<b>SECTION E</b>																																	
36	<p>Three friends Ankur, Kunal, and Chetan are standing in different lines to buy movie tickets. Their positions are shown by P, Q, R in the plot diagram.</p> <div></div> <p>Answer the following:</p> <p>(i) Find how far Ankur (P) and Chetan (R) are from each other.</p> <p>(ii) Is Kunal exactly halfway between Ankur and Chetan? Check by finding the midpoint of PR.</p> <p>(iii) Find the point on the x-axis that is at the same distance from P and Q.</p> <p style="text-align: center;"><b>OR</b></p> <p>If a point S divides the line joining P and Q in the ratio 2 : 3, find the coordinates of S.</p>	1 1 2   2																																
37	Some students went on a trip to a wildlife park. They climbed up a watchtower (P) that was 18 meters above a small lake. From the top, they noticed two points A and B on the opposite sides of the lake. The angle of depression from the tower to point A was $60^\circ$ , and to point B was $30^\circ$																																	

	 <p>Now, answer the following:</p> <p>(i) Find the distance PA.</p> <p>(ii) Find the distance PB.</p> <p>(iii) Find the width of the lake (AB).</p> <p>OR</p> <p>If a bird at point Q is seen from P at an angle of elevation of <math>30^\circ</math>, find how high the bird (BQ) is above the lake.</p>	<p>1</p> <p>1</p> <p>2</p> <p>2</p>
38	<p>Neha saves ₹24 during the first month, ₹30 in the second month and ₹36 in the third month. She continues to save in this manner.</p>  <p>On the basis of above information answer the following questions.</p> <p>(i) Whether the monthly savings of Neha form an AP or not? If yes then write the first term and common difference.</p> <p>(ii) What is the amount that she will save in 15th month?</p> <p>(iii) In which month, will she save ₹66?</p> <p>OR</p> <p>What is the common difference of an AP whose <math>n</math>th term is <math>8 - 5n</math>?</p>	<p>1</p> <p>1</p> <p>2</p> <p>2</p>

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