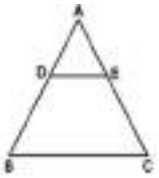
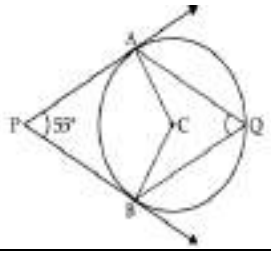
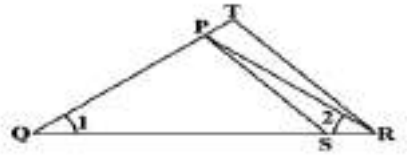
	KENDRIYA VIDYALAYA SANGATHAN, MUMBAI REGION **SESSION: 2025 - 26** **PREBOARD I EXAMINATION** **MATHEMATICS (STANDARD) – 041** **CLASS - X** **Maximum Marks: 80** **Time: 3 hours**	
	General Instructions: **Read the following instructions carefully and follow them:** 1. This question paper contains 38 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 $\pi = 22/7$ 10. Use of calculators is not allowed. wherever required if not stated.	
	SECTION A	
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 α and β 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 $-3x + k y = -9$ 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	In the ΔABC, D and E are points on side AB and AC respectively such that DE || BC. If AE = 2 cm, AD = 3 cm and BD = 4.5 cm, then CE equals (a) 1 (b) 2 (c) 3 (d) 	1
9	If ΔABC is right angled at C, then the value of sin (A + B) is (a) 0 (b) 1 (c) 1/ 2 (d) √3/ 2	1
10	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 30°.What is the height of the flagpole (in meters)? (a) 25√3 (b) 75√3 (c) 150 (d) 50√3	1
11	If $2\sin^2 A - \cos^2 A = 2$, then A is: (a)90° (b) 0° (c) 45° (d) 30°	1
12	The area of a circle that can be inscribed in a square of side 6 cm is: (a) 36 π cm^2 (b) 18 π cm^2 (c) 9 π cm^2 (d) 12 π cm^2	1
13	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 ∠AQB is (a) 62½° (b) 55° (c) 125° (d) 90° 	1
14	If the sum of the areas of two circles with radii R^1 and R^2 is equal to the area of a circle of radius R, then: (a) $R_1{}^2 + R_2{}^2 = R^2$ (b) $R_1 + R_2 < R$ (c) $R_1 + R_2 = R$ (d) $R_1 + R_2 < R_2$	1
15	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 (a) 3 cm (b) 5 cm (c) 7 cm (d) 10 cm	1
16	What is the probability of getting 53 Mondays in a Leap year? (a) 1/7 (b) 1/5 (c) 2/7 (d) 3/5	1
17	Rahul is playing with two dice. what is the probability of getting not doublet? (a) 1/3 (b) 1/6 (c) 1/5 (d) 5/6	1
18	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 (a) 1/13 (b) 9/13 (c) 4/13 (d) 12/13	1
	DIRECTION: 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 but reason (R) is not the correct explanation of assertion (A). (c) Assertions (A) is true but reason (R) is false. (d) Assertions (A) is false but reason (R) is true.	

19	**Assertion (A):** If the second term of an A.P., is 13 and the fifth term is 25, then its 7th term is 33. **Reason (R):** If the common difference of an A.P is 5, then $a_{18} - a_{13}$ is 25.	1
20	**Assertion (A):** 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. **Reason (R):** Volume of the cone = 1/3 ($\pi r^2 h$) .	1
	SECTION B	
21	Find HCF and LCM of 404 and 96 and verify that HCF × LCM = Product of the two given numbers.	2
22	A ladder 15 m long just reaches the top of a vertical wall. If the ladder makes an angle of 60° with the wall, then find the height of the wall . OR Evaluate: $(5\sin^2 30 + \cos^2 45 + 4\tan^2 60) / (2\sin^2 30 \cos^2 60 + \tan^2 45)$	2
23	In the given figure, QR / QS =QT /PR and $\angle 1 = \angle 2$, Show that $\Delta PQS \sim \Delta TQR$. 	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	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? OR The length of the minute hand of a clock is 14 cm. Find the area swept by the minute hand in 5 minutes.	2
	SECTION C	
26	Prove that $\sqrt{5}$ is an irrational number.	3
27	The relationship between the times x (in hours) of travel and the distances y covered (in kilometers) of the two cars is represented by the following equations $2x + y = 6$ $2x - y - 2 = 0$ Solve the following system of equations graphically and calculate the area of the triangle formed by these two lines and the x-axis.	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 = 6cm and DC = 8cm.If the area of ΔABC is 84 cm^2, find the lengths of sides AB and AC.	3

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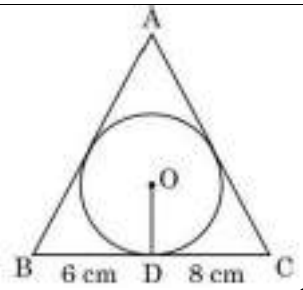
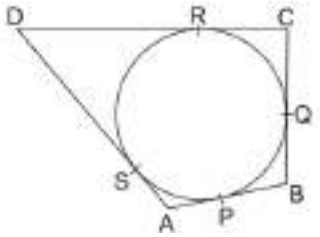
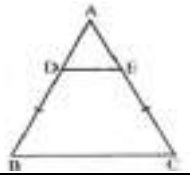
<tr><td></td><td> 

OR
A quadrilateral ABCD is drawn to circumscribe a circle, as shown in the given
Show that AB+CD=AD+BC.
 
</td><td></td></tr>
<tr><td>29</td><td>The area of a rectangular garden (in m²) is given by $p(x) = 2x^2 – x – 6$, where x is its length (in m).
(i) For which two values of x will the area be zero?
(ii) Verify the relationship between the zeroes and the coefficients.</td><td>3</td></tr>
<tr><td>30</td><td>Prove that: $(\sin A + \operatorname{cosec} A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A$
OR
If $x = p \sec \theta + q \tan \theta$ and $y = p \tan \theta + q \sec \theta$, then prove that $x^2 – y^2 = p^2 – q^2$</td><td>3</td></tr>
<tr><td>31</td><td>A school’s marks distribution is given below. Find the mode and suggest about student performance?
<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></td><td>3</td></tr>
<tr><td></td><td>SECTION D</td><td></td></tr>
<tr><td>32</td><td>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

Using the above result, prove the following.
In the given figure, DE ∥ BC and BD = CE.
Prove that Δ ABC is an isosceles triangle.
  </td><td>5</td></tr>
<tr><td>33</td><td>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.</td><td>5</td></tr>
<tr><td>34</td><td>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.
OR
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</td><td>5</td></tr>
</table>

	provision of 26 m^2 of canvas for stitching and wastage. Also, find the cost of the canvas to be purchased at the rate of ₹ 500 per m^2.	
35	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.	5

Marks Scored	20-60	60-100	100-140	140-180	180-220	220-260
Number of students	7	5	16	12	2	3

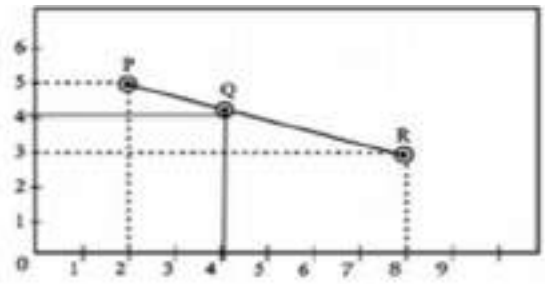
OR

The distribution below gives the marks of 100 students of a class, if the median marks are 24, find the frequencies f_1 and f_2.

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

SECTION E

36 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.



Answer the following:

(i) Find how far Ankur (P) and Chetan (R)are from each other. 1

(ii) Is Kunal exactly halfway between Ankur and Chetan? Check by finding the midpoint of PR. 1

(iii) Find the point on the x-axis that is at the same distance from P and Q. 2

OR

If a point S divides the line joining P and Q in the ratio 2 : 3, find the coordinates of S. 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°, and to point B was 30°

	 Now, answer the following: (i) Find the distance PA. (ii) Find the distance PB. (iii)Find the width of the lake (AB). OR If a bird at point Q is seen from P at an angle of elevation of 30°, find how high the bird (BQ) is above the lake.	1 1 2 2
38	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.  On the basis of above information answer the following questions. (i)Whether the monthly savings of Neha form an AP or not? If yes then write the first term and common difference. (ii) What is the amount that she will save in 15th month? (iii)In which month, will she save ₹66? OR What is the common difference of an AP whose nth term is 8 – 5n?	 1 1 2 2

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