KENDRIYA VIDYALAYA SANGATHAN,ERNAKULAM REGION

I PREBOARD EXAMINATION : 2026-27

CLASS X MATHEMATICS

Duration: 3 hours **Max.Marks : 80**

General Instructions:

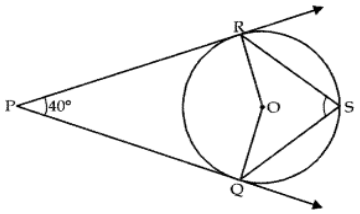
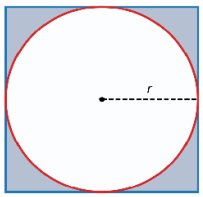
Read the following instructions carefully and follow them:

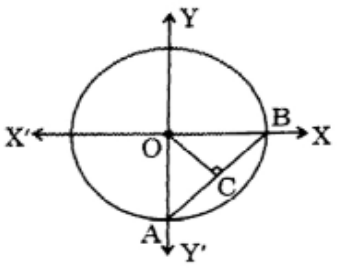
1. This question paper contains 38 questions. All Questions are compulsory.
2. This Question Paper is divided into 5 Sections A, B, C, D and E.
3. In Section A, Question numbers 1-18 are multiple choice questions (MCQs) and questions no. 19 and 20 are Assertion- Reason based questions of 1 mark each.
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.

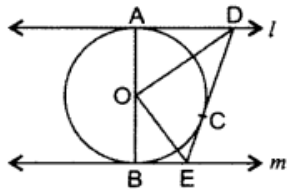
Draw neat and clean figures wherever required.Take $\pi = \frac{22}{7}$ wherever required if not stated.

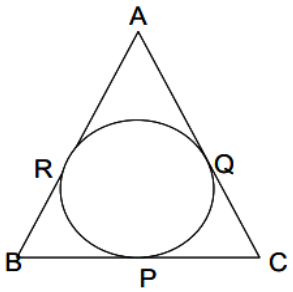
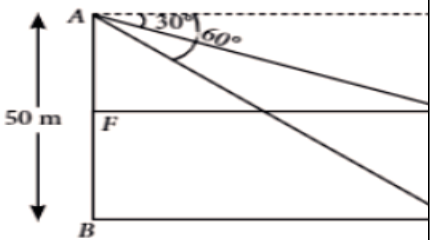
9. Use of calculators is not allowed.

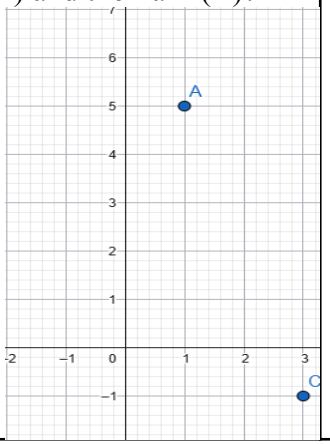
Q. No	**SECTION A** **Section A consists of 20 questions of 1 mark each.**	**Marks**
1	If the HCF of 96 and 404 is 4, then their LCM is: (A) 9696 (B) 969 (C) 9696/4 (D) 10100	1
2.	If the zeroes of the quadratic polynomial $x^2 + (a + 1) x + b$ are 2 and -3, then (A) a = -7, b = -1 (B) a = 5, b = -1 (C) a = 2, b = -6 (D) a – 0, b = -6	1
3	The value of k for which the system of equations 3x-ky= 7 and 6x+ 10y =3 is inconsistent, is (A)-10 (B) -5 (C) 5 (D) 7	1
4	If the roots of the quadratic equation $x^2+px+12=0$ are in the ratio1∶3, then the value of p is: . (A) p±8 (B) p=±16 (C) 4 (D) - 4	1
5	If the nth term of an AP is 2n + 1, then the common difference is : (A) 2 (B) 3 (C) 4 (D) 5	1
6	The shortest distance (in units) of the point (4,-3) from y-axis is (A) -3 (B) -4 (C) 3 (D) 4	1

7	The length of an arc of a circle of radius 12 cm, subtended by an angle of 45° at the center is: (A) 4π (B) 3 π (C) 5 π (D) 6 π	1
8	If the distance between the points $(x,-1)$ and (3,2) is 5, then the value of x is: (A) -7 or -1 (B) 7 or 1 (C) -7 or 1 (D) 7 or -1	1
9	In a right-angled triangle ABC, with ∠B=90°, if sinA=$\frac{1}{2}$, then the value of cotA (A) $\sqrt{3}$ (B) $\frac{1}{\sqrt{3}}$ (C) $\frac{2}{\sqrt{3}}$ (D) 1	1
10	In fig., PQ and PR are tangents drawn from P. If ∠QPR = 40°, then the measure of ∠QSR is:  ji (A) 50 (B) 180 (C) 140 (D) 70	1
11	If ΔABC ~ ΔRPQ, AB = 3 cm, BC = 5 cm, AC = 6 cm, RP = 6 cm and PQ = 10, then RQ is : (A)12 (B) 16 (C) 14 (D)10	1
12	The length of a tangent drawn to a circle of radius 8 cm from a point at a distance of 17cm from the centre of the circle is (A) 64cm (B) 15cm (C) 9cm (D) 50cm	1
13	A square has a side length of 2r cm. A circle of radius r cm is inscribed inside it. Find the area of the remaining (shaded) portion of the square.  (A) r^2 (4 + π) cm^2 (B) r^2 cm^2 (C) r^2 (4 – π) cm^2 (D) $3r^2$ ($\frac{\pi}{2}$ – 1)	1
14	If sin A + $\sin^2$A = 1, then the value of the expression ($\cos^2$ A + $\cos^4$A) is (A) 1 (B) $\frac{1}{2}$ (C) 2 (D) 3	1
15	A solid toy consists of a hemisphere mounted on a cylinder of the same radius. Which formula would be needed to calculate its total surface area? (A) CSA of cylinder + CSA of hemisphere (B) CSA of cylinder + CSA of hemisphere + area of one circular base (C) TSA of cylinder + TSA of hemisphere (D) Volume of cylinder + volume of hemisphere	1
16	The LCM of $2x$,$3x$ and $5x$ (where x is a positive integer) is (A)$10x$ (B) $30x^3$ (C) $15x$ (D) $30x$	1
17	A solid cylinder of radius r and height h is placed over other cylinder of same height and radius. The total surface area of the shape so formed is	1

	(A) $4\pi rh + 4\pi r^2$ (B) $4\pi rh - 4\pi r^2$ (C) $4\pi rh + 2\pi r^2$ (D) $4\pi rh - 2\pi r^2$	
18	A pole casts a shadow of 10 m when the angle of elevation of the Sun is 45°. The height of the pole is: (A) 5 m (B) 10 m (C) $10\sqrt{2}$ m (D) 20 m	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): If the graphical representation of a system of equations results in two parallel lines, the system is inconsistent. Reason (R): In an inconsistent system, there is no point common to both lines.	1
20	Assertion (A): $\sqrt{11}$ is an irrational number. Reason (R): If p is prime number then $\sqrt{p}$ is always an irrational number	1
	SECTION – B **Section B consists of 5 questions of 2 marks each.**	
21	How many two digits numbers are divisible by 3? **OR** Find the 9th term from the end (towards the first term) of the A.P. 5,9,13, …185.	2
22	In the given figure, A, B and C are points on OP, OQ and OR respectively such that AB || PQ and AC || PR. Show that BC || QR. **OR** In Δ ABC, $DE \| BC$ with D on AB and E on AC.If AD= 4cm , DB= 7cm and AE=($x + 1)cm$ While EC= $(4x - 1)cm$.Find the value of x .	2
23	If tan α = $\sqrt{3}$ and tan β = $\frac{1}{\sqrt{3}}$, 0 < α, β < 90°, find the value of cot (α + β).	2
24	In the given figure a circle centered at origin O has radius 7cm , OC is median of Δ OAB. Find the length of the median OC. 	2
25	The length of the minute hand of a clock is 28 cm. Find the area swept by the minute hand in 10 minutes.	2

	SECTION – C **Section C consists of 6 questions of 3 marks each.**	
26	Prove that $\sqrt{7}$ is irrational number. **OR** An inspector wants to distribute 84 balls and 180 bats equally among the greatest possible number of boys. How many boys can receive the gifts?	3
27	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.	3
28	If α and β are the zeroes of the polynomial $ax^2 + bx + c$, find the value of $\alpha^2 + \beta^2$	3
29	Seven times a two digit number is equal to four times the number obtained by reversing the order of the digits. If the difference of the digits is 3, determine the number. **OR** A fraction becomes $\frac{1}{3}$ when 1 is subtracted from the numerator and it becomes $\frac{1}{4}$ when 8 is added to its denominator. Find the fraction.	3
30	Prove that $\frac{\sin\theta - 2\sin^3\theta}{2\cos^3\theta - \cos\theta} = \tan\theta$	3
31	In the figure, l and m are two parallel tangents to a circle with centre O, touching the circle at A and B respectively. Another tangent at C intersects the line l at D and m at E. Prove that ∠DOE = 90° 	3
	SECTION – D **Section D consists of 4 questions of 5 marks each**	
32	During heavy rain, a car's windscreen wiper rotates about a fixed point. The effective length of the wiper blade is 42 cm, and it moves through an angle of 120° from one extreme position to the other. Take π = 22/7. **(a)** Find the length of the arc traced by the tip of the wiper during one sweep. **(b)** Find the area of the sector swept by the wiper during one sweep. **(c)** The two extreme positions of the wiper and the chord joining their tips form a minor segment. Find the area of this minor segment. Use √3 = 1.73	5
33	i) Prove that the lengths of tangents drawn from an external point to a circle are equal. ii)Using above result, find the length BC of *Δ*ABC. Given that, a circle is inscribed in *Δ*ABC touching the sides AB, BC and CA at R, P and Q respectively and AB= 10 cm, AQ= 7cm ,CQ= 5cm.	5

		
34	Due to sudden floods, some welfare associations jointly requested the government to get 100 tents fixed immediately and offered to contribute 50% of the cost. If the lower part of each tent is of the form of a cylinder of diameter 4.2 m and height 4 m with the conical upper part of same diameter but of height 2.8 m, and the canvas to be used costs 100 per sq. m, find the amount, the associations will have to pay. (Use $\pi = \frac{22}{7}$) **OR** A rocket is in the form of a right circular cylinder closed at the lower end and surmounted by a cone with the same radius as that of the cylinder. The diameter and height of the cylinder are 6 cm and 12 cm, respectively. If the slant height of the conical portion is 5 cm, find the total surface area and volume of the rocket [Use $\pi = 3.14$]	5
35	A plane left 30 minutes late than its scheduled time and in order to reach the destination 1500 km away in time, it had to increase its speed by 100 km/h from the usual speed. Find its usual speed. **(OR)** A motor boat whose speed is 18 km/h in still water takes 1 hour more to go 24 km upstream than to return downstream to the same spot. Find the speed of the stream.	5
	SECTION – E **Section E consists of 3 case study-based questions of 4 marks each.**	
36	There are two temples on each bank of a river. One temple is 50m high. While doing a renovation work, a man standing on the top of the 50m tall temple, observes that the angle of depression of the top and bottom of the other temple are 30^0 and 60^0 respectively. [use$\sqrt{3}$=1.73] Based on the above information, answer the following questions:   (i) Find the measure of ∠ACB. (ii) (a)What is the height of the other temple? **(OR)** (ii)(b)Find the width of the river. (iii) Find the difference in the heights of the two temples?	4
37	Rohan wants to buy a car and takes a loan of ₹1,18,000 from a bank. He begins repaying the loan by making a first installment of ₹1,000. He increases the installment amount by ₹100 every month. 1. Form an AP for the above context.	4

	2. What is the amount of Rohan's 30th installment? 3.What is the total amount Rohan will have paid after 30 installments? OR Find the number of installments Rohan needs to close his loan.	
38	Ravi, a civil engineer, is planning the layout for a new residential colony. He uses a coordinate system for precise planning. He identifies three key locations: Community Center (A) , Park(B) & Library (C) **1.** What is the distance between the Community Center (A) and the Park (B)? **2.** Find the distance of the Park(B) from the origin. **3.** Name the triangle formed by the given vertices OR A junction point P must be installed on the path connecting the Park (B) and the Library (C) such that it divides the segment {BC} internally in the ratio 3:2. Find the coordinates of the junction point P. 	4