

KENDRIYA VIDYALAYA SANGATHAN JABALPUR REGION
PRE BOARD
CLASS-X 2025-26
MATHEMATICS BASIC-241

Time Allowed: 3 Hours

Maximum Marks: 80

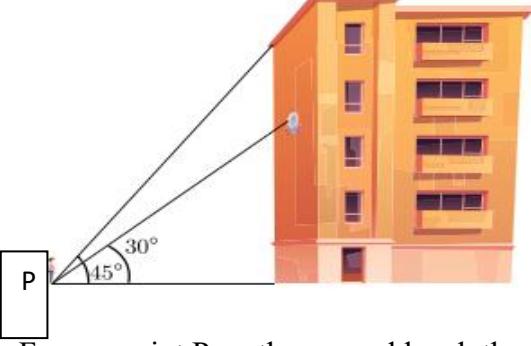
General Instructions:

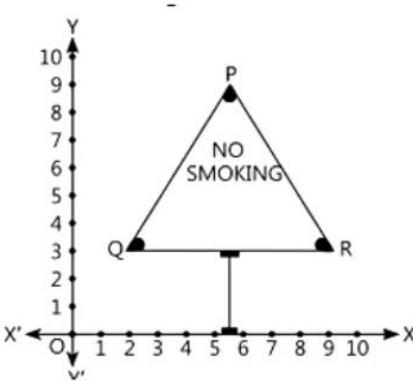
1. This Question Paper has 5 Sections A, B, C, D, and E.
2. Draw neat figures wherever required. Take $\pi = 22/7$ wherever required if not stated.

Q.NO.	SECTION A	MARKS
1	If the HCF of two numbers is 18 and their product is 12960 then their LCM will be : (a) 600 (b) 420 (c) 720 (d) 800	1
2	The zeroes of the quadratic equation $x^2 + 7x + 10$ are : (a) both positive (b) both negative (c) both equal (d) one positive & one negative	1
3	The pair of equations $3x - 5y = 7$ and $-4x + 10y = 8$ have (a) a unique solution (b) infinitely many solutions (c) no solution (d) two solutions	1
4	What is the area of the sector of a circle of radius 7 cm and angle 60° (a) $77/6$ (b) $77/3$ (c) $154/3$ (d) $154/6$	1
5	The value of $\sin^2 60^\circ + \cos^2 60^\circ$ (a) 1 (b) 0 (c) -1 (d) 2	1
6	A quadratic equation $ax^2 + bx + c = 0$ has two distinct real roots if (a) $b^2 - 4ac = 0$ (b) $b^2 - 4ac < 0$ (c) $b^2 - 4ac > 0$ (d) $b - 4ac > 0$	1
7	If the diameter of two circles are in the ratio of 3 : 4, then their perimeters are in the ratio of: (a) 4:3 (b) 3:4 (c) 16:9 (d) 9:16	1
8	The total surface area of a solid hemisphere of diameter 14 cm is: (a) $447\pi \text{ cm}^2$ (b) $239\pi \text{ cm}^2$ (c) $174\pi \text{ cm}^2$ (d) $147\pi \text{ cm}^2$	1
9	If the angle between two radii of a circle is 110° , then the angle between the tangents at the ends of the radii is: (a) 90° (b) 50° (c) 70° (d) 40°	1
10	If ABC and DEF are two triangles and $\frac{AB}{DE} = \frac{BC}{FD}$, then the two triangles are similar if (a) $\angle A = \angle F$ (b) $\angle B = \angle D$ (c) $\angle A = \angle D$ (d) $\angle B = \angle E$	1
11	Which of the following is not a similarity criterion for two triangles? (a) AAA (b) SAS (c) SSS (d) ASA	1
12	In ΔABC , right-angled at B, AB = 24 cm, BC = 7 cm. The value of $\tan C$ is: (a) $12/7$ (b) $24/7$ (c) $20/7$ (d) $7/24$	1
13	The value of $\sin 60^\circ \cos 30^\circ + \sin 30^\circ \cos 60^\circ$ is: (a) 0 (b) 1 (c) 2 (d) 4	1
14	There is a circular path around a sports field. Priya takes 18 minutes to drive one round of the field. Harish takes 12 minutes. Suppose they both start at the same point and at the same time and go in the same direction. After how many minutes will they meet? (a) 36 minutes (b) 18 minutes (c) 6 minutes (d) They will not meet	1
15.	Which of the following is not a measure of central tendency?	

	(a) Mean (b) median (c) mode (d) probability													
16	If the points A(6, 1), B(8, 2), C(9, 4) and D(p, 3) are the vertices of a parallelogram, taken in order, then the value of p is (a) 4 (b) -6 (c) 7 (d) -2	1												
17	A card is selected at random from a well-shuffled deck of 52 cards. The probability of it being a face card is (a) $3/13$ (b) $6/52$ (c) $6/13$ (d) $1/52$													
18	For the following distribution: <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>Class</td> <td>0-5</td> <td>5-10</td> <td>10-15</td> <td>15-20</td> <td>20-25</td> </tr> <tr> <td>Frequency</td> <td>10</td> <td>15</td> <td>12</td> <td>20</td> <td>9</td> </tr> </table> the modal class is (a) 10-15 (b) 15-20 (c) 20-25 (d) 5-10	Class	0-5	5-10	10-15	15-20	20-25	Frequency	10	15	12	20	9	
Class	0-5	5-10	10-15	15-20	20-25									
Frequency	10	15	12	20	9									
19	Assertion(A): If HCF of 404 and 96 is 4 ,then the LCM of 404 & 96 is 4848 Reason(R): As HCF (a,b) x LCM (a,b) =a x b (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) Assertion (A) is true but Reason (R) is false. (d) Assertion (A) is false but Reason (R) is true.													
20	Assertion(A): The coordinates of the origin is (0,0). Reason(R): As formula for the internal division is $[(m_1x_2 + m_2x_1)/(m_1 + m_2), (m_1y_2 + m_2y_1)/(m_1 + m_2)]$ (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). Assertion (A) is true but Reason(R) is false. (d) Assertion (A) is false but Reason (R) is true.													
	SECTION B													
21	If the lines $3x + 2ky - 2 = 0$ and $2x+5y+1 = 0$ are parallel, then find the value of k.	2												
22	If $(1 - \cos A)(1 + \cos A) = \frac{3}{4}$, Find the value of $\cot A$	2												
23	Two concentric circles are of radii 10 cm and 6 cm. Find the length of the chord of the larger circle that touches the smaller circle.	2												

24	<p>ABCD is a trapezium in which $AB \parallel DC$ and its diagonals intersect each other at the point O. Show that $AO/BO = CO/DO$.</p> <p style="text-align: center;">(OR)</p> <p>The diagonals of a quadrilateral ABCD intersect each other at the point O such that $AO/BO = CO/DO$. Show that ABCD is a trapezium.</p>	2
25.	<p>The perimeter of a sector of a circle of radius 5.7 m is 27.2 m. Find the area of the sector.</p> <p style="text-align: center;">(OR)</p> <p>The radii of two circles are 8cm and 6cm respectively. Find the radius of the circle having area equal to the sum of the areas of the two circles.</p>	2
SECTION-C		
26.	<p>If two dice are thrown simultaneously, find the probability of getting</p> <ol style="list-style-type: none"> Sum as a prime number. Product of the number is at least 10. 	3
27	<p>Find a Quadratic polynomial whose zeroes are twice the zeroes of the polynomial $x^2 + 3x + 2$</p>	3
28	<p>Prove that $5 + 2\sqrt{3}$ is an irrational number, where $\sqrt{3}$ is an irrational number.</p> <p>OR</p> <p>Prove that $\sqrt{5}$ is irrational.</p>	3
29	<p>Prove that the lengths of tangents from an external point to a circle are equal.</p>	3
30	<p>The taxi charges in a city consist of a fixed charge to get her with the charge for the distance covered. For a distance of 10 km, the charge paid is Rs105, and for a journey of 15km, the charge paid is Rs.155.</p> <ol style="list-style-type: none"> What are the fixed charges and charges per kilometer? How much does a person have to pay for travelling a distance of 25 km? <p style="text-align: center;">(OR)</p> <p>Solve the following pair of linear equations by substitution method</p> $7x - 15y = 2$ $x + 2y = 3$	3
31.	<p>$(\sin A + \operatorname{cosec} A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A$</p> <p style="text-align: center;">(OR)</p> <p>Prove that $\frac{\cot A - \cos A}{\cot A + \cos A} = \frac{\operatorname{cosec} A - 1}{\operatorname{cosec} A + 1}$</p>	3
SECTION D (LONG ANSWER TYPE)		
32	<p>The sum of the areas of two squares is 640 m^2. If the difference of their perimeters is 64m, find the sides of the two squares.</p> <p style="text-align: center;">(OR)</p>	5

	(B) Solve for x and y , graphically: $2x + y = 6$; $x + y = 5$															
33	Prove that If a line is drawn parallel to one side of a triangle to intersect other two sides in distinct points ,the other two sides are divided in the same ratio .	5														
34	Find mean and mode of the following distribution: <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>Class</td><td>0-20</td><td>20-40</td><td>40-60</td><td>60-80</td><td>80-100</td><td>100-120</td></tr><tr><td>Frequency</td><td>10</td><td>35</td><td>52</td><td>61</td><td>38</td><td>29</td></tr></table>	Class	0-20	20-40	40-60	60-80	80-100	100-120	Frequency	10	35	52	61	38	29	5
Class	0-20	20-40	40-60	60-80	80-100	100-120										
Frequency	10	35	52	61	38	29										
35	A tent is in the shape of a cylinder surmounted by a conical top. If the height and diameter of the cylindrical part are 2.1 m and 4 m respectively, and the slant height of the top is 2.8 m, find the area of canvas used for making the tent. Also, find the cost of the canvas of the tent at the rate of Rs.500 per m^2 . (OR) From a solid cylinder whose height is 8 cm and radius is 6 cm, a conical cavity of height 8 cm and the base radius 6 cm is hollowed out. Find the volume of the remaining solid, correct to two places of decimal. Also, find the total surface area of the remaining solid. (Take $\pi = 3.14$)	5														
	SECTION E (CASE-BASED QUESTIONS)															
36	A manufacturer of TV sets produced 600 sets in the third year and 700 sets in the seventh year. Assuming that the production increases uniformly by a fixed number every year. (i) Which formula can you use to solve the above problem? (ii) Find the production in the 1st year (iii) Find the production in the 10th year OR (iii) Find the total production in the first 7 years	1 1 2														
37.	A clinometer is a tool that is used to measure the angle of elevation, or angle from the ground, in a right - angled triangle. We can use a clinometer to measure the height of tall things that you can't possibly reach to the top of, flag poles, buildings and trees. Ravish got a clinometer from school lab and started the measuring elevation angle in surrounding. He saw a building on which society logo is painted on wall of building.   From a point P on the ground level, the angle of elevation of the roof of the building is 45° and the angle of elevation of the center of logo is 30° from the same point. The point P is at a distance of 24 m from the base of the building. Based on the above information, answer the following questions: (i) What is the height of the building from ground? (ii) What is the aerial distance of the point P from the top of the building? (iii) Justify if the sum of the aerial distances between the point P from the logo and from the top of the building is more than 32m.	1 1 2														

	<p>(iii) Justify if the ratio between the aerial distances from the point P to the logo and to the top of the building $2\sqrt{3}: 3\sqrt{2}$</p>	
38.	<p>A local NGO organized a rally titled “Youth Against Tobacco” to discourage teenagers from getting addicted to smoking. For the rally, volunteers created triangular placards showing facts about the dangers of smoking. The shape of the placard is shown in the figure, where the coordinates of P, Q, and R are integral points. Refer to the triangular design and answer the following questions.</p> <p></p> <p>i. Find the coordinates of the mid-point of Q and R.</p> <p>ii. Find the area of the triangle PQR.</p> <p>iii. Find the point on the X-axis, which is equidistant from points Q and R.</p> <p>OR</p> <p>iii Find the centroid of the triangle PQR</p>	<p>1</p> <p>1</p> <p>2</p>