

PRE BOARD QUESTION PAPER(LUCKNOW REGION)

Class X Session 2024-25

MATHEMATICS BASIC (Code No.241)

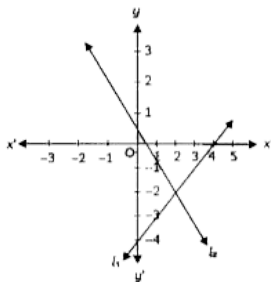
TIME: 3 hours

MAX.MARKS: 80

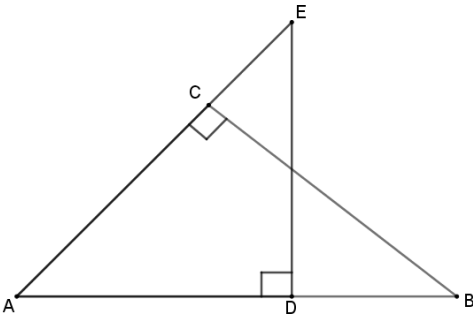
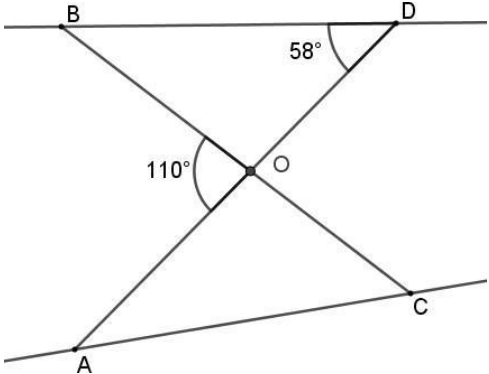
General Instructions:

Read the following instructions carefully and follow them:

1. This question paper contains 38 questions.
2. This Question Paper is divided into 5 Sections A, B, C, D and E.
3. In Section A, Questions no. 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, Questions no. 21-25 are very short answer (VSA) type questions, carrying 02 marks each.
5. In Section C, Questions no. 26-31 are short answer (SA) type questions, carrying 03 marks each.
6. In Section D, Questions no. 32-35 are long answer (LA) type questions, carrying 05 marks each.
7. In Section E, Questions no. 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. All Questions are compulsory. However, an internal choice in 2 Questions of section B, 2 Questions of section C and 2 Questions of section D has been provided. And internal choice has been provided in all the 2 marks questions of Section E.
9. Draw neat and clean figures wherever required.
10. Take $\pi = 22/7$ wherever required if not stated.
11. Use of calculators is not allowed.

	Section A	
	Section A consists of 20 questions of 1 mark each.	
1.	If the HCF of two numbers is 9 and their product is 405. Find the LCM. (A) 55 (B) 45 (C) 54 (D) 44	1
2.	The system of linear equations represented by the lines l and m is  (A) consistent with unique solution (B) inconsistent (C) consistent with three solutions (D) consistent with many solutions	1

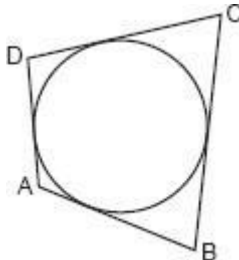
3.	Which of the following are the roots of the quadratic equation, $x^2 - 9x + 20 = 0$ (A) 3,4 (B) 4,5 (C) 5,6 (D) 6,7	1
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4.	The distance between the points (a, b) and $(-a, -b)$ is (A) $\sqrt{a^2 + b^2}$ (B) $a^2 + b^2$ (C) $2\sqrt{a^2 + b^2}$ (D) $4\sqrt{a^2 + b^2}$	1
5.	The angle between two tangents drawn from an external point to a circle is 110° . The angle subtended at the centre by the segments joining the points of contact to the centre of circle is: (A) 70° (B) 90° (C) 135° (D) 145°	1
6.	In the $\triangle ABC$, D and E are points on side AB and AC respectively such that $DE \parallel BC$. If $AE = 2$ cm, $AD = 3$ cm and $BD = 4.5$ cm, then CE equals (A) 1cm (B) 2 cm (C) 4cm (D) 3 cm	1
7.	The value of $(\sin 45^\circ + \cos 45^\circ)$ is (A) $\frac{1}{\sqrt{2}}$ (B) $\frac{2}{\sqrt{2}}$ (C) $\frac{3}{2}$ (D) $\frac{1}{4}$	1
8.	In the given figure, $\triangle BAC$ is similar to  (A) $\triangle AED$ (B) $\triangle EAD$ (C) $\triangle ACB$ (D) $\triangle BCA$	1
9.	If two positive integers a and b are written as $a = x^3 y^2$ and $b = xy^3$; x, y are prime numbers, then HCF (a, b) is (A) xy (B) xy^2 (C) $x^3 y^3$ (D) $x^2 y^2$	1
10.	PT madam arranged the students of class 7 in an order, so that it followed an AP. Find the 10th term of the A.P. 4, 9, 14, ..., 254 (A) 46 (B) 49 (C) 47 (D) 48	1
11.	In the given figure, if $\triangle OCA \sim \triangle ODB$ then $\angle OAC$ is equal to 	1

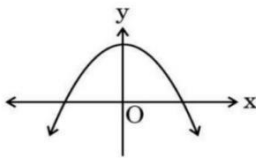
	(A) 58° (B) 55° (C) 128° (D) 52°															
12.	The perimeters of two similar triangles are 15 cm and 25 cm respectively. If one side of first triangle is 9 cm, the corresponding side of the other triangle (A)10 cm (B) 5 cm (C) 15 cm (D) 25 cm	1														
13.	Given that $\sin \alpha = 1/2$ and $\cos \beta = 1/2$, then the value of $(\beta - \alpha)$ is (A) 0° (B) 60° (C) 30° (D) 90°	1														
14.	Volume and surface area of a solid hemisphere are numerically equal. What is the diameter of hemisphere? (A) 9units (B) 6units (C) 4.5units (D) 18units	1														
15.	A card is selected from a deck of 52 cards. The probability of being a face card is (A) $3/13$ (B) $2/13$ (C) $1/2$ (D) $3/26$	1														
16.	Nature of roots of quadratic equation $2x^2 - 4x + 3 = 0$ is (A) real (B) equal (C) not real (D) none of them	1														
17.	The median class of the following data is:<table><tr><td>Marks</td><td>0-10</td><td>10-20</td><td>20-30</td><td>30-40</td><td>40-50</td><td>50-60</td></tr><tr><td>No. of students</td><td>8</td><td>10</td><td>12</td><td>22</td><td>30</td><td>18</td></tr></table> (A) 20-30 (B) 40-50 (C) 30-40 (D) 10-20	Marks	0-10	10-20	20-30	30-40	40-50	50-60	No. of students	8	10	12	22	30	18	1
Marks	0-10	10-20	20-30	30-40	40-50	50-60										
No. of students	8	10	12	22	30	18										
18.	A quadratic polynomial whose zeroes are $\frac{2}{5}$ and $-\frac{1}{5}$ is (A) $25x^2 + 5x - 2$ (B) $5x^2 - 2x + 1$ (C) $5x^2 + 2x - 1$ (D) $25x^2 - 5x - 2$	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 and 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															
19	Assertion(A): Sum of natural number from 1 to 10 is 5050 Reason(R): The formula of general term a_n is $a_n = a + (n- 1)d$	1														
20	Assertion(A): $(2-\sqrt{5})$ is an irrational number. (AO1) Reason(B): The sum or difference of a rational and an irrational number is irrational.	1														

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	Section B													
	Section B consists of 5 questions of 2 marks each.													
21 (A).	P(a, b) is a point equidistant from the points A(5,4) and B(4,5) Prove that a – b = 0.	2												
	OR													
21 (B).	The base QR of an equilateral triangle PQR lies on x-axis. The co-ordinates of point Q are (-4, 0) and the origin is the mid-point of the base. Find the coordinates of the point R.													
22.	In figure if $\angle ATO = 40^\circ$, find $\angle AOB$.	2												
23 (A).	The first three terms of the AP are 3y-1, 3y+5 and 5y+1 respectively. Find the value of y.	2												
	OR													
23 (B).	The sum of first n terms of an A.P. is represented by $S_n = 6n - n^2$. Find the common difference.													
24.	If $\sin (A + B) = \frac{\sqrt{3}}{2}$ and $\sin (A - B) = \frac{1}{2}$, $0 \leq A + B \leq 90^\circ$ and $A > B$, then find A and B.	2												
25.	Calculate mode of the following distribution: <table border="1"><tr><td>Class</td><td>0-20</td><td>20-40</td><td>40-60</td><td>60-80</td><td>80-100</td></tr><tr><td>Frequency</td><td>5</td><td>10</td><td>12</td><td>6</td><td>3</td></tr></table>	Class	0-20	20-40	40-60	60-80	80-100	Frequency	5	10	12	6	3	2
Class	0-20	20-40	40-60	60-80	80-100									
Frequency	5	10	12	6	3									
	Section C													
	Section C consists of 6 questions of 3 marks each.													
26.	Prove that $\sqrt{3}$ is irrational.	3												
27 (A).	John and Mary are planning to meet for lunch. John is at his office located at point A (2, 3) and Mary is at her home located at point B (10, 7). They decide to meet at a café that divides the way from John's office to Mary's home in the ratio 2:3. Find the coordinates of the café.	3												
	OR													

27 (B).	Find the ratio in which the line $4x + y - 4 = 0$ divides the line segment joining the points A (-2, -1) and B (3, 5)													
28.	$\frac{\cos A}{1 + \sin A} + \frac{1 + \sin A}{\cos A} = 2 \sec A$ Prove that	3												
29.	<table border="1"><tr><td>Class</td><td>0-20</td><td>20-40</td><td>40-60</td><td>60-80</td><td>80-100</td></tr><tr><td>Frequency</td><td>17</td><td>p</td><td>32</td><td>24</td><td>10</td></tr></table> The arithmetic mean of the following frequency distribution is 50. Find the value of p.	Class	0-20	20-40	40-60	60-80	80-100	Frequency	17	p	32	24	10	3
Class	0-20	20-40	40-60	60-80	80-100									
Frequency	17	p	32	24	10									
30. (A)	In figure, a circle touches all the four sides of a quadrilateral ABCD whose sides are AB = 6 cm, BC = 9 cm and CD = 8 cm. Find the length of side AD 	3												
	OR													
30 (B).	Prove that the lengths of tangents drawn from an external point to a circle are equal.	3												
31.	Solve $2x + 3y = 11$ and $2x - 4y = -24$ and hence find the value of 'm' for which $y = mx + 3$	3												
	SECTION-D Section D consists of 4 questions of 5 marks each													
32 (A).	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 the 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 .	5												
	OR													
32 (B).	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.	5												
33.	If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, then prove that the other two sides are divided in the same ratio.	5												

34.	The perimeter of sector OACB of the circle centre at O and of radius 24, is 73.12 cm. (i) Find the central angle $\angle AOB$. (ii) Find the area of the minor segment ACB. (Use $\pi = 3.14$ and $\sqrt{3} = 1.73$)	5
35 (A).	From the top of a 9 m high building, the angle of elevation of the top of a cable tower is 60° and angle of depression of its foot is 45°. Determine the height of the tower and distance between building and tower. (Use $\sqrt{3} = 1.732$)	5
OR		
35 (B).	As observed from the top of a 75 m high lighthouse from the sea level, the angles of depression of two ships are 30° and 45°. If one ship is exactly behind the other on the same side of the lighthouse, find the distance between the two ships (Use $\sqrt{3} = 1.732$)	5
Section E		
36.	A, B, C, D and E are five friends. They prepared some numbered card with labelled from 11 to 60 and then they put all the number cards in the empty box. In this game, every friend was asked to pick the card randomly and after each draw, card was replaced back in the box.	
(i)	Find the probability that the number on the drawn card is an odd number	1
(ii)	Find the probability that the number on the drawn card is a perfect square number	1
(iii)	Find the probability that the number on the drawn card is : a) divisible by 5 b) a prime number less than 20	2

	(AO1)	
37	Rainbow is an arch of colours that is visible in the sky after rain or when water droplets are present in the atmosphere. The colours of the rainbow are generally, red, orange, yellow, green, blue, indigo and violet. Each colour of the rainbow makes a parabola. We know that any quadratic polynomial $p(x)=ax^2+bx+c(a\neq 0)$ represents a parabola on the graph paper.   Based on the above, answer the following questions :	
(i)	The graph of a rainbow $y=f(x)$ is shown in the figure. Write the number of zeroes of the curve.	
(ii)	If the graph of a rainbow does not intersect the x -axis but intersects y -axis at one point, then how many zeroes will it have?	
(iii)	If a rainbow is represented by the quadratic polynomial $p(x)=x^2+(a+1)x+b$, whose zeroes are 2 and -3 , find the value of a and b.	
38	Rasmi decided to spend her pocket money which her parents gave her . She started buying two of her favourite chocolates every day after school and her savings started to decrease . the pattern of decrease followed in this manner 27,24,21,.....0 	
(i)	What was her saving on the fifth day?	1
(II)	What was the original saving and by what amount it was decreasing?	1
(III)	On which day her savings became 0?	2

