

DELHI PUBLIC SCHOOL – BANGALORE SOUTH
PRE BOARD -1 EXAMINATION –NOVEMBER (2025 - 2026)
SUBJECT: MATHEMATICS (SET-2) (CODE-041)

CLASS: X
DATE: 24/11/ 2025

MAX.MARKS:100
TIME: 3hrs

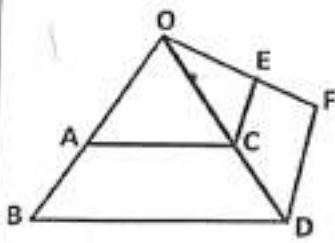
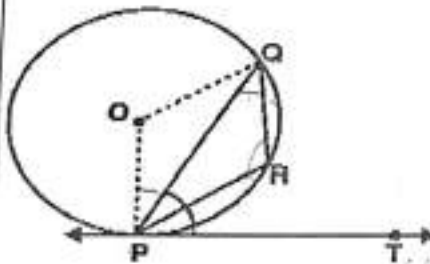
GENERAL INSTRUCTIONS:

1. This Question Paper has 5 Sections A-E.
2. Section A has 20 MCQs carrying 1 mark each
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. Section E has 3 case based integrated units of assessment (04 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 2 Questions of 5 marks, 2 Questions of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E
8. Draw neat figures wherever required. Take $\pi = 22/7$ wherever required if not stated.

SECTION - A

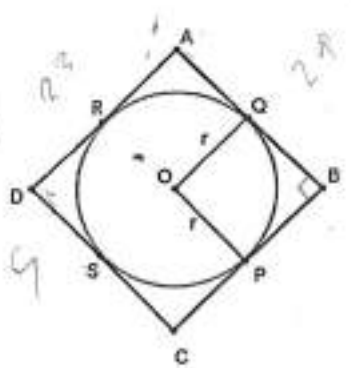
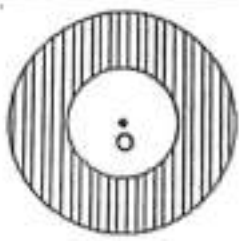
Section A consists of 20 questions of 1 mark each.

1	If $A = 2n + 13$, $B = n + 7$, where n is a natural number, then HCF of A and B is: a) 2 b) 1 c) 3 d) 4.	1M
2	If a, b are the zeroes of $f(x) = 2x^2 + 8x - 8$, then a) $a + b = ab$ b) $a + b > ab$ c) $a + b < ab$ d) $a + b + ab = 0$	1M
3	A streetlight bulb is fixed on a pole 6 m above the level of the street. If a woman of height 1.5 m casts a shadow of 3 m, find how far she is away from the base of the pole. a) 12 m b) 10 m c) 9 m d) 11m	1M
4	The tops of two poles of heights 20 m and 14 m are connected by a wire. If the wire makes an angle of 30° with the horizontal, then the length of the wire is a) 8 m b) 10 m c) 12 m d) 14 m	1M
5	The fourth vertex D of a parallelogram $ABCD$ whose three vertices are $A(-2, 3)$, $B(6, 7)$ and $C(8, 3)$ is a) $(0, 1)$ b) $(0, -1)$ c) $(-1, 0)$ d) $(1, 0)$	1M
6	In an MCQ test, a student guesses the correct answer x out of y times. If the probability that the student guesses the answer to be wrong is $2/3$ then what is the relation between x and y is a) $y = 3x$ b) $x = 3y$ c) $3x = 2y$ d) $2x = 3y$	1M
7	For the given pair of linear equations $ax + y = 1$ and $x + ay = a$, find the value of $x + y$ a) 0 b) 1 c) $1 + a$ d) a	1M

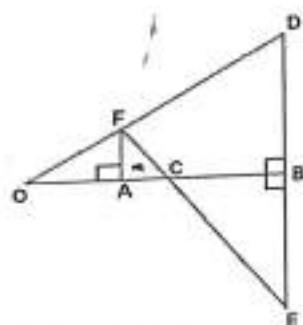
8	Values of k for which the quadratic equation $2x^2 - kx + k = 0$ has equal roots is a) 0 only b) 8 only c) 4 only d) 0 and 8	1M
9	In the figure, $AC \parallel BD$ and $CE \parallel DF$. If $OA = 12$ cm, $AB = 9$ cm, $OC = 8$ cm and $EF = 4.5$ cm, then the value of FO is 	1M
10	If the numbers $n - 2$, $4n - 1$ and $5n + 2$ are in AP, then the value of n is a) 3 b) 4 c) 1 d) 2	1M
11	What is/are the roots of $3x^2 = 6x$? a) only 2 b) only 3 c) 0 and 6 d) 0 and 2	1M
12	Two APs have the same common difference. The first term of one of these is -1 and that of the other is 8. Then the difference between their 4th terms is a) -1 b) -8 c) 7 d) 49	1M
13	A solid is of the form of a cone of radius ' r ' surmounted on a hemisphere of the same radius. If the height of the cone is the same as the diameter of its base, then the volume of the solid is : a) πr^3 b) $3\pi r^3$ c) $\frac{4}{3} \pi r^3$ d) $\frac{2}{3} \pi r^3$	1M
14	If $3 \cot \theta = 4$ then $\frac{5 \sin \theta + 3 \cos \theta}{5 \sin \theta - 3 \cos \theta} =$ a) $\frac{1}{3}$ b) 3 c) 9 d) $\frac{1}{9}$	1M
15	In the figure below, PQ is a chord of a circle and PT is the tangent at P such that $\angle QPT = 60^\circ$. Then $\angle PRQ$ is equal to 	1M
16	If the value of mean and mode are respectively 30 and 15, then median equals a) 22.5 b) 24.5 c) 25 d) 26	1M

17	If P(-1, 1) is the midpoint of the line segment joining A(-3, b) and B(1, b+4) then b equals a) 1 b) -1 c) 2 d) 0	1M
18	A sphere of diameter 18 cm is dropped into a cylindrical vessel of diameter 36 cm, partly filled with water. If the sphere is completely submerged, then the water level rises (in cm) by a) 3 b) 4 c) 5 d) 6	1M
	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): Given two circles of radii R and r such that $R=3r$ with the same sector angles, the area of the sector of the bigger circle is thrice the area of the sector of the smaller circle. Reason (R): The arc length of a sector is doubled if the radius of the circle is doubled for the same sector angle.	1M
20	Assertion(A): The probability of getting a bad egg in a lot of 400 is 0.035. The number of good eggs in the lot is 386. Reason(R): If the probability of an event is p, the probability of its complementary event will be 1-p	1M

SECTION - B														
21	Prove that $11 + 3\sqrt{7}$ is an irrational number, given that $\sqrt{7}$ is irrational.	2M												
22	<p>Sweety, Nitesh, and Ashraf visited a hospital for their annual body checkup, which included a blood pressure evaluation. The results of their systolic blood pressure readings are as follows: Sweety: 121 mmHg Nitesh: 147 mmHg Ashraf: 160 mmHg The table below depicts the systolic blood pressure ranges of all the patients who visited the hospital on the same day.</p> <table><tr><th>Blood pressure (mmHg)</th><th>Number of patients</th></tr><tr><td>115 -125</td><td>10</td></tr><tr><td>125-135</td><td>9</td></tr><tr><td>135-145</td><td>12</td></tr><tr><td>145-155</td><td>19</td></tr><tr><td>155-160</td><td>10</td></tr></table> <p>Who among the three friends have a blood pressure reading that falls in the modal class? Also find the mode.</p>	Blood pressure (mmHg)	Number of patients	115 -125	10	125-135	9	135-145	12	145-155	19	155-160	10	2M
Blood pressure (mmHg)	Number of patients													
115 -125	10													
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135-145	12													
145-155	19													
155-160	10													

23	<p>In given figure, a circle is inscribed in a quadrilateral ABCD in which $\angle B = 90^\circ$. If AD = 23 cm, AB = 29 cm and DS = 5 cm, find the radius r of the circle.</p> 	2M
24	 <p>OR</p> <p>In the given figure, the area of the shaded region between two concentric circles is 286 cm^2. If the difference of the radii of the two circles is 7 cm, find the sum of their radii.</p> <p>A boy is cycling such that the wheels of the cycle are making 140 revolutions per minute. If the diameter of the wheel is 60 cm, calculate the speed per hour with which the boy is cycling. [Use $\pi = \frac{22}{7}$]</p>	2M
25	<p>Drish lives in India and Hugh lives in the USA. The date formats of both the countries is given below. India: day/month USA: month/day They wrote dates every day in 2025. If a day in 2025 is randomly selected, what is the probability that both their dates in the two formats are the same on that day, also write the sample space for it?</p> <p>OR</p> <p>Cards marked with numbers 5 to 50 are placed in a box and mixed thoroughly. A card is drawn from the box at random. Find the probability that the number on the taken out card is</p> <ol style="list-style-type: none"> a prime number less than 10. a number which is a perfect square. 	2M
SECTION - C		
26	<p>Ranjita, Neha and Salma start weaving sweaters at the same time for the children of an orphan home. They need 15, 18 and 20 days, respectively, to complete a sweater. After how many days will all of them start making a new sweater again? By that time how many sweaters would have been completed by them together?</p>	3M
27	<p>Zeroes of the quadratic polynomial $p(x) = (a^2 + 10)x^2 - 74x + 7a$ are reciprocal of each other and they are rational. Find the values of 'a'.</p>	3M
28	<p>Check graphically whether the pair of linear equations $2x + 3y = 12$; $5x - 3y = 9$ is consistent. If so, solve it graphically.</p> <p>OR</p> <p>A man's age is three times the sum of the ages of his two sons. After 5 years, his age will be twice the sum of the ages of his two sons. Find the age of the man.</p>	3M

29



OB is the perpendicular bisector of the line segment DE,
 $FA \perp OB$ and FE intersects OB at the point C. Prove that

$$\frac{1}{OA} + \frac{1}{OB} = \frac{2}{OC}$$

3M

30

In an acute angled triangle ABC, if $\sin(A + B - C) = \frac{1}{2}$ and
 $\cos(B + C - A) = \frac{1}{2}$, find $\angle A$, $\angle B$ and $\angle C$.

3M

31

- (a) Find the sum of all integers between 150 and 500, which are divisible by 9.
OR
 (b) How many numbers lie between 10 and 300, which when divided by 4 leave a remainder 3? Also, find their sum.

3M

SECTION - D

32

The median of the following data is 868. Find the values of x and y, if the total frequency is 100.

5M

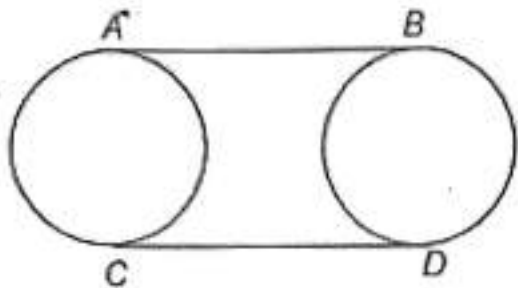
Class	Frequency
800-820	7
820-840	14
840-860	x
860-880	25
880-900	y
900-920	10
920-940	5

OR

A survey regarding the heights (in cm) of 50 girls of class X of a school was conducted and the following data was obtained:

Heights (in cm)	Number of girls
120 -130	2
130-140	8
140-150	12
150-160	20
160-170	8
Total	50

Find the mean and median of the above data.

33	i) If $\tan \theta + \sin \theta = m$ and $\tan \theta - \sin \theta = n$, show that $m^2 - n^2 = 4\sqrt{mn}$	3M
	ii) Find geometrically $\tan 45^\circ$.	2 M
34	i) Prove that the lengths of the tangents drawn from an external point to a circle are equal. ii) In figure, AB and CD are common tangents to two circles of equal radii. Prove that $AB=CD$.	3M 2M
		
35	<p>Two water taps together can fill a tank in $9\frac{3}{8}$ hours. The tap of larger diameter takes 10 hours less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill the tank.</p> <p style="text-align: center;">OR</p> <p>A peacock is sitting on the top of a pillar which is 9 m high. From a point 27 m away from the bottom of the pillar, a snake is coming to its hole at the base of the pillar. Seeing the snake the peacock pounces on it. If their speeds are equal at what distance from the hole is the snake caught?</p>	5M
SECTION -E		

36	<p>A drone was used to facilitate movement of an ambulance on the straight highway to a point P on the ground where an accident had taken place. The ambulance was travelling at the speed of 60 km/h. The drone stopped at a point Q, 100 m vertically above the point P. The angle of depression of the ambulance was found to be 30° at a particular instant. Based on above information, answer the following questions:</p> <p>(i) Represent the above situation with the help of a diagram.</p> <p>(ii) Find the distance between the ambulance and the site of accident (P) at the particular instant. (Use $\sqrt{3}=1.73$)</p> <p>(iii) (a) Find the time (in seconds) in which the angle of depression changes from 30° to 45°.</p> <p style="text-align: center;">OR</p> <p>(iii) (b) How long (in seconds) will the ambulance take to reach point P from a point T on the highway such that angle of depression of the ambulance at T is 60° from the drone?</p>	1 M 1 M 2 M
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A skilled carpenter decided to craft a special rolling pin for the local baker. He carefully joined three cylindrical pieces of wood two small ones on the ends and one larger in the centre to create a perfect tool. The baker loved the rolling pin, as it rolled out the smoothest dough for breads and pastries.

The length of the bigger cylindrical part is 12 cm and diameter is 7 cm and the length of each smaller cylindrical part is 5 cm and diameter is 1.4 cm. The handles is to be painted red color, while the rolling part is to be painted with varnish. Based on the above information, answer the following questions:



- (i) Find the total length of the rolling pin.
- (ii) Find the volume of the handles.
- (iii)(a) Find the ratio of the volume of the bigger cylindrical part to the total volume of the two smaller (identical) cylindrical parts.

1 M

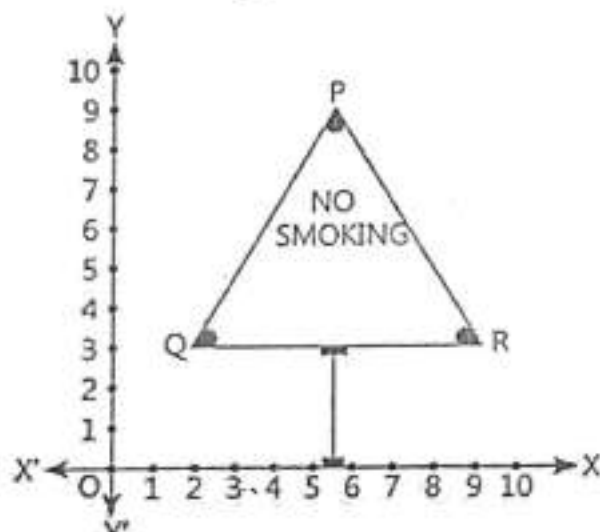
1 M

2 M

OR

- (iii)(b) Find the area to be painted red.

- 38 Most people know that smoking is injurious to health. So, some college students decided to start a campaign. To raise social awareness about hazards of smoking, they started "NO SMOKING" campaign. Some students were asked to prepare campaign banners in the shape of triangle which is as shown in the figure:



Based on the above information, solve the following questions:

- i) Find the coordinates of the mid-point of Q and R
- ii) Find the area of the triangle PQR.
- iii) Find the point on X-axis, which is equidistant from points Q and R.

1 M

1 M

OR

2 M

Find the centroid of the triangle PQR.