BANGALORE SAHODAYA SCHOOLS COMPLEX ASSOCIATION

PREBOARD II 2024-2025

CLASS: X   SUBJECT: MATHEMATICS(241)   MM: 80

TIME: 3 Hours   SET 1

NAME OF STUDENT : ....   CLASS AND ROLL NO: ....

General Instructions:

□ *The question paper consists of five sections- A, B, C,D and E .Each part compulsory.*
□ *Section A has 20 questions of 1 mark each.*
□ *Section B has 5 questions of 2 marks each .Internal choice has been provided in two questions.*
□ *Section C has 6 questions of 3 marks each .Internal choice has been provided in two questions.*
□ *Section D has 4 questions of 5 marks each .Internal choice has been provided in two questions.*
□ *Section E has 3case based integrated units of assessment (4 marks each).*

SECTION A

1.   The LCM of two numbers is 182 and their HCF is 13. If one of the numbers is 26, the other number is.

   A) 84   B) 81   C) 90   D) 91

2.   The zeros of the quadratic polynomial $6x^2 + x - 12$ are

A) $-3, 4$ B) $\frac{3}{2}, \frac{-4}{3}$ C) $\frac{4}{3}, \frac{-3}{2}$ D) $\frac{-4}{3}, \frac{-3}{4}$

3.   If one root of the quadratic equation $2x^2 + kx - 6 = 0$ is 2, the value of k is

   A) 1   B) -1 C) 2   D) None of these

4.   If the system of equations $2x + 3y = 5$ and $4x + ky = 10$ has infinitely many solutions, then $k =$

   A) -1 B) 0   C) 1   D) 2

5.   The coordinates of one end point of a diameter of a circle are $(4, -1)$ and the coordinates of the

centre of the circle are $(1, -3)$. Find the coordinates of the other end of the diameter.

   A) $(-2, -5)$ B) $(2, -5)$ C) $(-2, 5)$ D) $(2, 5)$

6.   If ΔABC and ΔDEF are similar such as that $2AB = DE$ and BC = 8 cm, then EF =

        A) 16 cm   B) 12 cm   C) 8 cm   D) 4 cm

7.   Find the value of $2tan^2 45° + cos^2 30° - sin^2 60°$

A) 2   B) 3   C) 5   D) 0

8.   If $2cos3\theta = 1$, find the value of θ.

   A) 30°   B) 45°   C) 45°   D) 20°

9.   In the given Fig. $PQ \parallel BC$, if AP = 2, PB = 3, AQ = 3, then QC = ?

   A) 2   B) 5   C) 9/2   D) 3
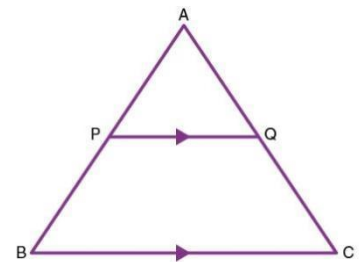
10. A chord of a circle of radius 10 cm subtends right angle at the centre. The area of minor sector is .

   A) 76.5   B)78.5   C) 157   D) 15.7

11. If angle between two radii of a circle is 130°, the angle between the tangents at the ends of radii is

   A) 90°   B) 50°   C) 65°   D) 25°

12. The surface area of a cube is 216 cm², its volume is

   A) $144\ cm^3$ B) $196\ cm^3$ C) $212\ cm^3$ D) $216\ cm^3$

13. The curved surface area of a right circular cone of height 15 cm and base diameter 16 cm is

   A) $60\pi\ cm^2$ B) $68\pi\ cm^2$ C) $120\pi\ cm^2$ D) $136\pi\ cm^2$

14. The mean of first n odd natural number is

A) $\frac{n+1}{2}$ B) $\frac{n}{2}$ C) n D) n^2

15. The radii of two circles are 19 cm and 9 cm respectively. Find the radius of the circle which has circumference equal to the circumference of the two circles.

   A) $10\ cm$ B) 25 cm   C) $19\ cm$ D) 28 cm

16. For the following distribution. Find the lower limit of modal class

Class	0 – 5	5 – 10	10 – 15	15 – 20	20 – 25
Frequency	10	15	12	25	9

   A) 20   B) 9   C) 25   D) 15

17. Two dice are rolled simultaneously. What is the probability of coming doublets?

A) $\frac{1}{6}$ B) $\frac{7}{36}$ C) $\frac{11}{36}$ D) $\frac{13}{36}$

18. $(1 - \sin^2 A)$ is equal to

   A) $cosec^2 A$ B) $cos^2 A$ C) $cot^2 A$ D) $tan^2 A$

DIRECTION: In the question number 19 and 20, a statement of assertion (1) is followed by a statement of Reason (2). Choose the correct option

   (A) Statement-1 is true, Statement-2 is true; Statement-2 is a correct explanation for Statement-1
   (B) Statement-1 is true, Statement-2 is true; Statement-2 is a not correct explanation for Statement-1
   (C) Statement-1 is true, Statement-2 is false.
   (D) Statement-1 is false, Statement-2 is true.

19. Statement -1 (Assertion): If HCF (90, 144) =18, then LCM (90, 144) = 720

   Statement -2 (Reason):   HCF $(a, b) \times$ LCM $(a, b) = a \times b$

20. Statement -1 (Assertion): In ΔABC, if AB = 24 cm, BC = 10 cm and AC = 26 cm, then ΔABC is a right angled triangle.

Statement -2 (Reason): If the corresponding sides of two triangles are equal, then the triangles are similar.

SECTION B

21. For which value of k will the following pair of linear equations have no solution?

$3x + y = 1,$ $(2k - 1)x + (k - 1)y = 2k + 1$

22. Solve $101x + 99y = 499$, $99x + 101y = 501$

23. If tangents PA and PB from a point P to a circle with centre O are inclined to each other at angle of 80°, then find the value of $\angle POA$.

24. Find the area of quadrant of circle whose circumference is 22 cm.

OR

Find the circumference of a circle whose area is equal to the sum of areas of two circles having radii 8cm and 6cm respectively.

25. If $sin\,(A + B) = 1$ and $cos\,(A - B) = \frac{\sqrt{3}}{2}$, here A and B are acute angles, then find the measures of angles A and B.

OR

Given $15\,cotA = 8$, find $sinA$ and $secA$.

SECTION C

26. Show that $\sqrt{3}$ is irrational.

27. Find the zeroes of the following quadratic polynomial $6x^2 - 3 - 7x$ and verify the relationship between the zeroes and the coefficients.

28. The age of a man is twice the square of the age of his son. Eight years hence, the age of man will be 4 years more than three times the age of his son. Find their present ages.

OR

The diagonal of a rectangular field is 60 meters more than the shorter side. If the longer side is 30 meters more than the shorter side, find the sides of the field.

29. Prove that $\sqrt{\frac{1+sinA}{1-sinA}} = secA + tanA$

30. Prove that a parallelogram circumscribing a circle is a rhombus.

OR

Prove that 'The lengths of tangents drawn from an external point to a circle are equal.'

31. One card is thrown from a well-shuffled deck of 52 cards. Find the probability of getting
   (i) a black queen   (ii) the jack of hearts   (iii) a face card

SECTION D

32.   A train travels 360 km at a uniform speed. If the speed had been 5 km/hr more, it would have taken 1 hours less for the same journey. Find the speed of the train

OR

In a class test, the sum of shefali's marks in Mathematics and English is 30. Had she got 2 marks more in Mathematics and 3 marks less in English, the product of their marks would have been 210. Find her   marks in two subjects.

33.   Prove that 'If a line is drawn parallel to one side of a triangle intersecting the other two sides in distinct points, then the other two sides are divided in the same ratio.'

34.   A wooden article was made by scooping out a hemisphere from each end of a solid cylinder. If the height of the cylinder is 10 cm, and its base is of radius 3.5 cm, find the total surface area of the article.

OR

Rachel, an engineering student was asked to make a model in her workshop, which was shaped like a cylinder with two cones attached to its two ends, using thin aluminium sheet. The diameter of the model is 3 cm and its length is 12 cm. If each cone has a height of 2 cm, find the volume of the air contained in the model that Rachel made.

35.   In society the daily expenditure of 100 families are given below.

Expenditure (in Rupees)	140 – 160	160 – 180	180 – 200	200 – 220	220 – 240
Number of families	5	25	50	15	5

Calculate the mean expenditure of given 100 families. Also mention how many families are there having daily expenditure less than 220 Rupees

SECTION E
CASE STUDY

36. CARTESIAN- PLANE

Using Cartesian Coordinates we mark a point on a

graph by **how far along** and **how far up** it is.

The *left-right* (**horizontal**) direction is commonly

called X-axis.

The *up-down* (**vertical**) direction is commonly

called Y-axis.

In Green Park, New Delhi Ramesh is having a

rectangular plot ABCD as shown in the following figure. Sapling of Gulmohar is planted on the boundary
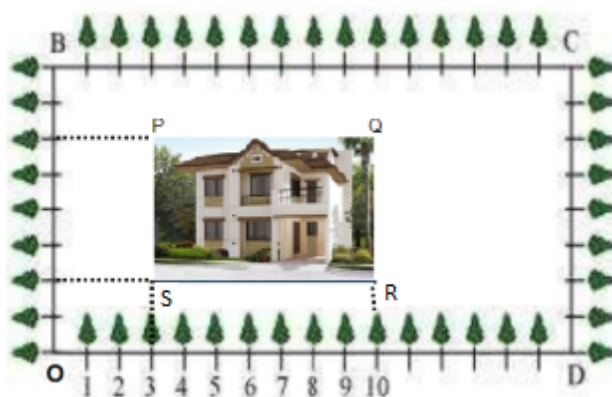
at a distance of 1m from each other. In the plot, Ramesh builds his house in the rectangular area PQRS. In the remaining part of plot, Ramesh wants to plant grass.

(i) Find the area of rectangle PQRS. (1)

(ii) Find the coordinates of a point on y – axis which is equidistant from point Q and R (2)

(iii) Find the coordinates of mid-point diagonal QS. (1)

37. 200 logs are stacked in the following manner: 20 logs in the bottom row, 19 in the next row, 18 in the row next to it and so on.

i) Form an A.P (1)

ii) Find in how many rows are the 200 logs placed. (1)

ii) Find the number of logs in the top most row. (2)

38. From a point on the ground the angle of elevation of the top of a 10 m tall building is 30°. A flag is hoisted at the top of the building and the angle of elevation of the top of the flagstaff is 45°.

(i) Draw a neat labeled figure to show the above situation (1)

(ii) Find the length of the flagstaff. (2)

(iii) Find the distance of the building from the point on the ground. (1)