DELHI PUBLIC SCHOOL, BANGALORE- EAST

PRE BOARD – 1 – (2019 – 2020)

SUBJECT: MATHEMATICS (SET – 1)

CLASS: X
DATE: 13/12/2019

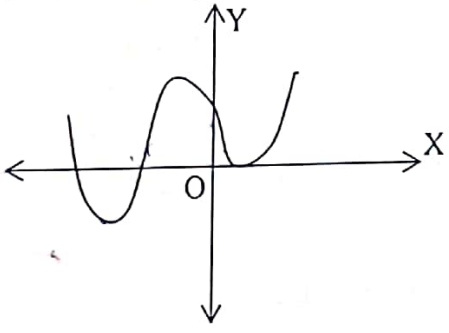
MAX-MARKS: 80
TIME: 3 HOURS
NAME :

GENERAL INSTRUCTIONS

- *All questions are compulsory.*
- *Read all the questions carefully.*
- *Marks for each question are indicated against it.*

SECTION – A **(20X1=20)**

1. If the HCF (a, b) = 3 and LCM (a, b) = 27, the value of ab is _____
   (A) 3 (B) 9 (C) 81 (D) 27
2. If the roots of the equation $3x^2 - 10x + k = 0$ are reciprocals of each other, then the value of k is ___
   (A) 3 (B) 10 (C) 7 (D) $\frac{10}{3}$
3. The number of solutions the following pair of linear equations has, is _____
   $x + 2y - 8 = 0$; $2x + 4y = 16$
   (A) Infinite (B) No solution (C) One (D) Two
4. Which of the given equations is not quadratic:
   (i) $8x^2 - 72 = 0$ (ii) $(x + 2)(x + 3) = x^2 + 5$
   (iii) $(x + 2)^2 + 3 = 12$ (iv) $x^2 - 5x = 6$
   (A) (i) (B) (ii) (C) (ii) (D) (i)
5. If 5, 8, 11,.... Is an A.P then a_n = _____
   (A) 3n+5 (B) 3n−2 (C) 3n+2 (D) 3n−5
6. If $P\left(\frac{a}{3}, 4\right)$ is the midpoint of the line segment joining the points Q(−6, 5) and R(−2 , 3) then the value of 'a' is _____
   (A) – 4 (B) – 12 (C) 12 (D) – 6
7. The number of zeroes the polynomial represented by the following graph is _____



   (A) 1 (B) 2 (C) 3 (D) 4
8. The area of a square inscribed in a circle of diameter 'p' cm is _____ :
   (A) p^2 *sq cm* (B) $\frac{p}{4}$ *sq cm* (C) $\frac{p^2}{2}$ *sq cm* (D) $\frac{p}{2}$ *sq cm*

9. $\Delta ABC \sim \Delta PQR$, ar($\Delta ABC$) = 392 sq cm and ar ($\Delta PQR$) = 200 sq cm. If AB = 14 cm then PQ = _____

(A) $\frac{50}{7}$ cm (B) 100 cm (C) 10 cm (D) 196 cm

10. The value of $\frac{tan^2 60^o - sin^2 30^o}{tan^2 45^o + cos^2 30^o}$ is _____.

(A) $\frac{7}{11}$ (B) $\frac{11}{13}$ (C) $\frac{13}{11}$ (D) $\frac{11}{7}$

11. The probability of getting a bad egg from a lot of 400 eggs is 0.035. Find the number of bad eggs in the lot.

12. Two tangents to a circle, from a point in the exterior are inclined at an angle of 60^o. Find the length of each tangent given that the radius of the circle is 3 cm.

13. If the mean of the following frequency distribution is 6, find the value of 'p'

x	2	4	6	10	$p+5$
f	3	2	3	1	2

14. Evaluate: $\frac{2\sin 68^o}{\cos 22^o} - \frac{2\cot 15^o}{\tan 75^o}$

15. If the mode of a distribution is 8 and its mean is also 8, then find the median.

16. Find 'k' so that 15, k, -1 are in A. P

17. A cylinder and a cone are of same base radius and of same height. Find the ratio of the volume of cylinder to that of the cone.

18. Find the value of 'k' for which the system of equations $2x + ky = 0$ and $x + 3y - 4 = 0$ is inconsistent.

19. Two cubes each with 6 cm edge are joined end to end. Find the surface area of the resulting solid.

20. A die is thrown twice. What is the probability that

i) Score is same both the times

ii) Second score is the square of the first

SECTION – B (6X2=12)

21. If a point P(x, y) is equidistant from the points A(5, 1) and B(-1, 5) show that $3x = 2y$.

(OR)

Find the area of a triangle ABC with vertices A(1, -4), B(3, -2) and C(-3, 16)

22. Express cosec A and tan A in terms of sec A.

23. If $\sin(x - 20^o) = \cos(3x - 10^o)$ then find the value of x.

24. If the radius of a circle is diminished by 10%, then by what percent will its area be diminished?

25. An integer is chosen between 0 and 100. Find the probability that the number is divisible by 3 and 5 both.

26. Find the mode of the following data.

Mark obtained	0 – 20	20 – 40	40 – 60	60 – 80	80 - 100
Number of students	6	21	24	5	4

(OR)

Find the combined mean of group of 150, if the mean of 50 students is 40 and that of other 100 students is 50.

SECTION – C (8X3=24)

27. Show that one and only one out of n, (n+1) and (n+2) is divisible by 3, where 'n' is a positive integer.

28. A part of monthly hostel charge is fixed and the remaining depends on the number of days one has taken food in the mess. When Swati takes food for 20 days, she has to pay ₹ 3000 as hostel charges whereas

Manasi who takes food for 25 days pays ₹ 3500 as hostel charges. Find the fixed charges and the cost of food per day.

(OR)

Solve the following pair of equations for x and y

$$3x + 2y = 9xy \quad ; \quad 9x + 4y = 21xy$$

29. The sum of the 2nd and 7th terms of an A.P is 30. If its 15th term is one less than twice its 8th term, find A.P.

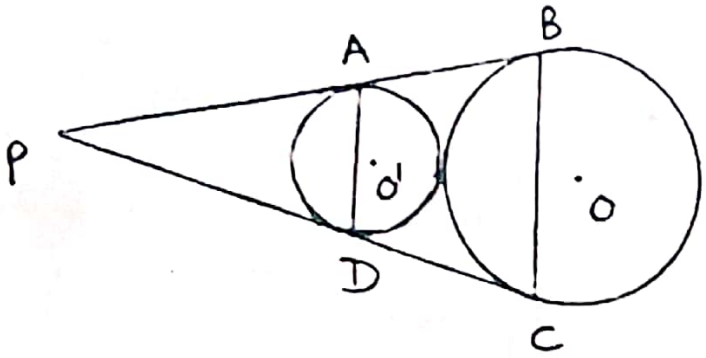
(OR)

How many terms are there in A.P whose 1st term and 6th term are (-12) and 8 respectively and the sum of all its terms is 120?

30. The coordinates of P and Q are (2,3) and (1,2) respectively. If X lies on PQ, find the coordinates of X such that PX : PQ = 4 : 7

31. In a right angled triangle ABC, right angled at A, if D is any point on AB, then prove that $DC^2=BC^2+BD^2-2AB.BD$

32. In the figure, PA and PD are tangents to the smaller circle with centre O'. PB and PC are tangents to the larger circle with centre O. Prove: ABCD is an isosceles trapezium.



(OR)

Two tangents PA and PB are drawn from an external point P to a circle with centre O. Prove that AOBP is a cyclic quadrilateral.

33. Construct a right angled triangle in which the sides other than hypotenuse are of lengths 5 cm and 4 cm. Construct another triangle whose sides are $\frac{5}{3}$ times the corresponding sides of the given triangle.

34. Prove : $(\sin\theta + 1 + \cos\theta)(sin\,\theta - 1 + cos\,\theta)sec\,\theta.cosec\,\theta = 2$

SECTION – D

(6X4=24)

35. Find all the zeroes of $x^4 - 5x^3 + x^2 + 15x - 12$, if it is given that two of its zeroes are 1 and 4.

36. A train covers a distance of 300 km at a uniform speed. Had the speed been 5 km/hr more, it would have taken 120 min less for the journey. Find the original speed of the train. .

(OR)

Solve for x :

$$2\left(\frac{2x-1}{x+3}\right) - 3\left(\frac{x+3}{2x-1}\right) = 5, \quad x \neq -3, x \neq \frac{1}{2}$$

37. Prove: 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.

38. The angle of elevation of an aeroplane from a point on the ground is 60°. After a horizontal flight of 10 seconds, the angle of elevation change to 30°. If the aeroplane is flying at a constant height of $2500\sqrt{3}$m, find the speed of the aeroplane.

39. From each end of a solid metal cylinder, metal was scooped out in hemispherical form of same diameter. The height of the cylinder is 10 cm and its base is of radius 4.2 cm. The rest of the cylinder is melted and converted into a cylindrical wire of 1.4 cm thickness. Find the length of the wire. (Use $\pi = \frac{22}{7}$)

(OR)

A container open at the top, is in the form of a frustum of a cone of height 24 cm with radii of its lower and upper circular ends as 8 cm and 20 cm respectively. Find the cost of the milk which can completely fill the container at the rate of ₹ 21 per litre. (Use $\pi = \frac{22}{7}$)

40. The following table gives the daily income of 50 workers of a factory. Draw both types ('less than' and 'more than') of ogives.

Daily income	100 – 120	120 – 140	140 – 160	160 – 180	180 - 200
Number of workers	12	14	8	6	10

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