Directorate of Education, GNCT of Delhi

Practice Paper 3

Class – X (2020-21)

Mathematics

Max. Marks: 80 **Duration: 3 hours**

General Instructions:

1. This question paper contains 36 questions divided into two parts A and B. All the questions are compulsory.
2. Part A consists of two sections- I and II. Section I has 16 questions of 1 mark each and Section II has 4 case study-based questions. Each case-study based questions have 5 sub-parts of 1 mark each.
3. Part B consists of 16 questions— 6 questions of 2 marks, 7 questions of 3 marks and 3 questions of 5 marks each.
4. There is no overall choice. However internal choices are provided in 5 questions of 1 mark , 2 questions of 2 marks, 2 questions of 3 marks and 1 question of 5 marks. You have to attempt only one of the alternatives in all such questions.
5. In case-study based questions, you have to attempt only four out of five sub-parts.
6. Use of calculator is not permitted.
7. Please write down the serial number of question before attempting it.

Part – A

Section – I

Question No 1 to 16 are of 1 mark each.

1. The zeroes of a polynomial p(x) are x-coordinates of those points where the graph of y=p(x) intersects _____.

   OR

   Find the value of 'b' if $\propto$ and $\frac{1}{\propto}$ are zeroes of polynomial $ax^2+bx+c=0$.

2. A pair of dice is thrown, find the probability of getting a sum of four.

   OR

   A number is chosen at random from the numbers – 3,–2,–1,0,1,2,3. What will be the probability that the square of this number is less than or equal to 1.

3. How many polynomials can be formed with –2 and 5 as zeroes?

4. What kind of lines are represented by the following pair of equations :

   $$6x - 3y + 10 = 0$$
   $$2x - y + 9 = 0$$

5. Is the equation $(\sqrt{2}x+\sqrt{3})^2+ x^2= 3x^2 - 5x$ quadratic ? Justify.

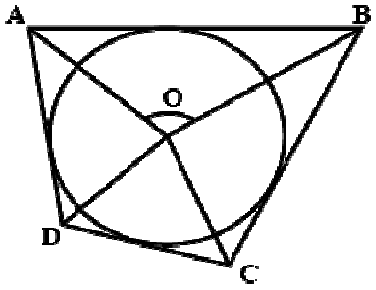
6. Find the 30th term of the A.P., 10, 7, 4…….

7. A circle is divided into 12 equal sectors. Find the central angle of each sector.

8. If the circumference of a circle and the perimeter of a square are equal, then find the relation between area of circle and area of square.

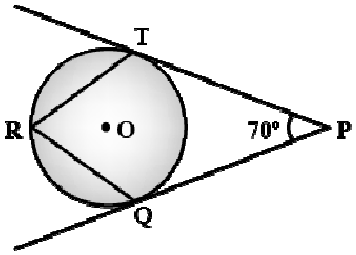
9. The pair of equations x + y – 4 = 0 and 2x + ky = 3 has no solution, find the value of k.

10. In the given figure, if $\angle AOB = 125^0$, then find $\angle$COD.



OR

In figure, O is the centre of a circle. PT and PQ are tangents to the circle from an external point P. If $\angle TPQ = 70^0$, then find $\angle$ TRQ.



11. In $\triangle ABC$ the points D and E are on the sides CA and CB respectively such that DE ∥ AB, AD = 2x, DC = x+3, BE = 2x – 1 and CE = x . Then the value of x is _____.

12. Find the value of $\sin^2 60^o + 2 \tan 45^0 - \cos^2 30^0$

OR

If $x = 2 \sin^2 A$ and $y = 2 \cos^2 A + 1$, then find the value of x + y.

13. Find the roots of the quadratic equation $x^2 - 0.04 = 0$.

14. The curved surface area of a cylinder is 264 m^2 and its volume is 924 m^3. Find the ratio of its height to its diameter.

OR

A solid ball gets exactly filled in the cubical box of side b. Find the volume of the ball.

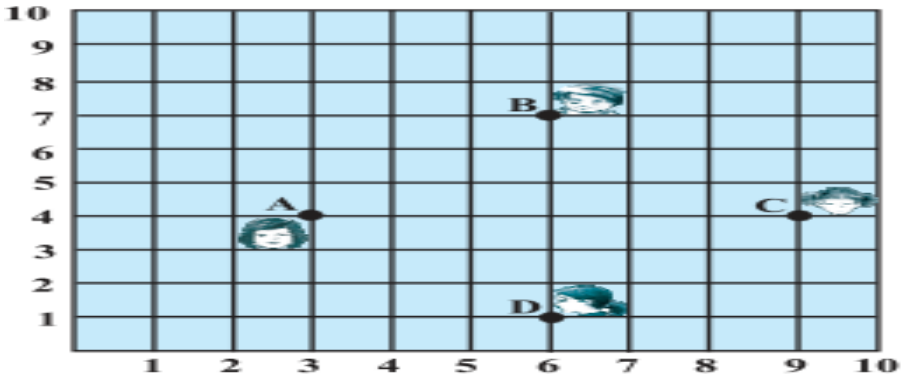
15. DEF is an equilateral triangle where DM⊥EF. Find the value of DM^2.

16. A line segment AB is to be divided in the ratio 2:3 then ray AX will be drawn such that ∠BAX is _____ angle.

Section II

Question number 17-20 are case-study based questions. Attempt any 4 sub parts from each question. Each sub part carries 1 mark.

17. In a classroom, 4 friends are seated at the points A, B, C and D as shown in figure. Mohit and Dheeraj walk into the class and after observing for a few minutes, Mohit decides to sit 4 point away from A along y-axis while Dheeraj wants to sit exactly in the middle of ABCD.



(i) What is the position of Mohit's seat ?
a) (8,3) b) (3,8) c) (7,4) d) (4,7)

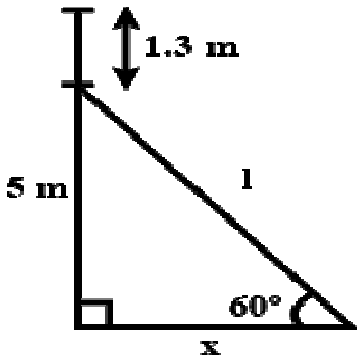
(ii) The coordinates of middle point of BC is
a) $(\frac{15}{2}, \frac{11}{2})$ b) $(\frac{2}{15}, \frac{11}{2})$ c) $(\frac{1}{2}, \frac{1}{2})$ d) $(\frac{1}{2}, \frac{11}{2})$

(iii) Dheeraj wants to sit at the coordinates :
a) (6,5) b) (5,6) c) (6,4) d) (4,6)

(iv) What is the distance between A and B ?
a) $3\sqrt{2}$ unit b) $2\sqrt{3}$unit c) $2\sqrt{2}$ unit d) $3\sqrt{3}$ unit

(v) What is the equation of line CD ?
a) x–y–5 = 0 b) x+y –5 = 0 c) x+y+5 = 0 d) x–y+5 = 0

18. An electrician has to repair an electric fault on a pole of height 5m. She needs to reach a point 1.3m below the top of the pole to undertake the repair work. She puts a ladder making an angle of 60^0 with the ground to reach the point of fault.



(i) What is the length of the ladder ?
a) 4.28 m b) $3.7/\sqrt{3}$ m c) 3.7 m d) 7.4 m

(ii) The distance of the pole from the foot of the ladder is
a) 3.7 m b) 2.14 m c) $\frac{1}{\sqrt{3}}$ d) $2\sqrt{3}$

(iii) If the ladder is placed at an angle of 30^0 with the ground, then what should be the length of the ladder ?
a) 7.4 m b) 3.7 m c) 1.3 m d) 5 m

(iv) What should be the angle between ladder and the pole ?
a) 60^0 b) 30^0 c) 90^0 d) 45^0

(v) What is the length of the pole from ground, where repair work is to be done ?
a) 1.3 m b) 5 m c) 3.7 m d) 3.1 m

19. There are three sections of class X in Kendriya Vidyalaya, Delhi Cantt. The total number of students in class tenth are 100. The marks obtained by the students in Preboard exam are presented in a table as given below. The mean of the marks obtained is 53.

Marks obtained	0 – 20	20 – 40	40 – 60	60 – 80	80 – 100
No. of students	15	18	21	29	p

(i) How many students got marks between 80 – 100?
a) 21 b) 38 c) 17 d) 26

(ii) What is the lower limit of modal class ?
a) 20 b) 40 c) 60 d) 80

(iii) What is the value of modal marks ?
a) 58 b) 62 c) 65 d) 68

(iv) What is the value of $\sum f_i x_i$?
a) 2900 b) 5300 c) 1500 d) 100

(v) What is the upper limit of the median class ?
a) 20 b) 40 c) 60 d) 80

20. For 71th republic day Parade on 26/01/2021 in Delhi, Captain RS Meel is planning for parade of following two groups: (1) First group of Army contingent of 624 members behind an army band of 32 members. (2) Second group of CRPF troops with 468 soldiers behind the 228 members of bikers. These two groups are to march in the same number of columns. This sequence of soldiers is followed by different states of Jhanki which are showing the culture of the respective states.

(i) What is the maximum number of columns in which the army troop can march?
a) 8 b) 16 c) 4 d) 32

(ii) What is the maximum number of columns in which the CRPF troop can march?
a) 4 b) 8 c) 12 d) 16

(iii) What is the maximum number of columns in which total army troop and CRPF troop together can march past?
a) 2 b) 4 c) 6 d) 8

(iv) What should be subtracted with the numbers of CRPF soldiers and the number of bikers so that their maximum number of column is equal to the maximum number of column of army troop?

a) 4 Soldiers and 4 Bikers b) 4 Soldiers and 2 Bikers
c) 2 Soldiers and 4 Bikers d) 2 Soldiers and 2 Bikers

(v) What should be added with the numbers of CRPF soldiers and the number of bikers so that their maximum number of column is equal to the maximum number of column of army troop?

a) 4 Soldiers and 4 Bikers b) 12 Soldiers and 12 Bikers
c) 6 Soldiers and 6 Bikers d) 12 Soldiers and 6 Bikers

Part –B

Question No. 21 to 26 are Very short answer Type questions of 2 marks each.

21. Find the value of d if HCF of 759 and 44 is 2d-13.

22. Determine the nature of roots of quadratic equation $x^2 - 5x - 7 = 0$.

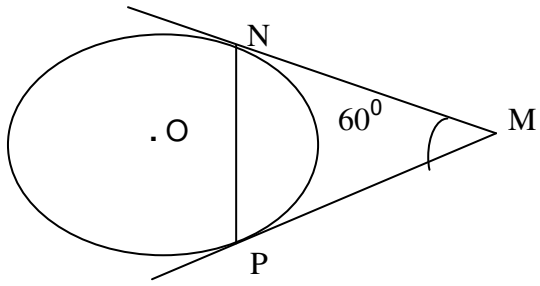
23. If (4, p) and (1, 0) are end points of the diameter of a circle of length 10cm, find the coordinates of centre of the circle.

24. AB is a line segment of length 8 cm. Locate a point C on AB such that $AC = \frac{1}{3} CB$.

25. A quadrilateral ABCD is drawn to circumscribe a circle. Prove that AB + CD = AD + BC .

OR

In the figure MN and MP are tangents to a circle with centre O. Find the length of the chord PN if MN= 4.5 cm.



26. If $x = a \sec \Theta$ and $y = b \tan \Theta$ then show that $b^2x^2 - a^2y^2 = a^2b^2$

OR

Find the value of θ if $\sin\theta - \sqrt{3}\cos\theta = 0, 0 < \theta < 90^0$

Question No. 27 to 33 are Short Answer Type questions of 3 marks each.

27. The length of the minute hand of a clock is 14 cm. Find the area swept by the minute hand in 5 minutes.

28. The mean of the following data is 25.2. Find the missing value k.

Class	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50
Frequency	8	12	10	11	k

29. ABC is an isosceles triangle right angled at C. Prove that $AB^2 = 2AC^2$.

OR

State and Prove Pythagoras Theorem.

30. The sum of the three digits of a positive integer is 15 and these digits are in AP. The number obtained by reversing the digits is 396 less than the original number. Find the number.

31. Draw a pair of tangents to a circle of radius 4 cm which are inclined to each other at an angle of 45^0.

32. Three consecutive positive integers are such that the sum of square of second integer and the product of first and third integer is 49. Find the integers.

OR

Find the roots of $\frac{x-1}{x+2} + \frac{x-3}{x-2} = \frac{11}{8}$

33. Find the median weight of the 30 students as per the distribution given below.

Weight (in kg)	40- 45	45- 50	50- 55	55- 60	60- 65	65-70	70- 75
No. of students	2	3	8	6	6	3	2

Question No. 34 to 36 are Long Answer Type questions of 5 marks each

34. A vessel is in the form of a hollow hemisphere mounted by a hollow cylinder. The diameter of the hemisphere is 14cm and the total height of the vessel is 13cm. Find the inner surface area of the vessel.

35. 8 women and 12 men can together finish a work in 10 days, while 6 women and 8 men can finish it in 14 days. Find the time taken by 1 woman alone to finish the work and also that taken by 1 man alone.

36. From the top of a vertical tower, the angles of depression of two cars, in the same straight line with the base of the tower, at an instant are found to be 30^0 and 45^0. If the cars are 83 m apart and on the same side of the tower, find the height of the tower.

OR

Two poles AB and PQ of same height 35 m are standing opposite each other on either side of the road. The angles of elevation of the top of the poles, from a point C between them on the road, are 60^0 and 30^0 respectively. Find the distance between the poles.