TARUN CLASSES OF MATHEMATICS
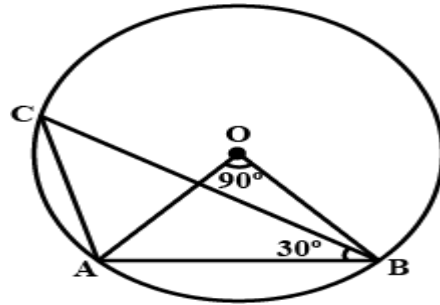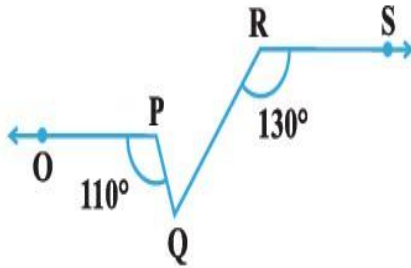
MATHEMATICS –(041)
Class IX – 2019-2020

MAX. MARKS : 80   DURATION : 3HOURS

SECTION –A

1) Degree of the polynomial $4x^4 + 0x^3 + 0x^5 + 5x + 7$ is   (A) 4   (B) 5   (C) 3   (D) 7

2) The perpendicular distance of the point P (6,-8) from the y-axis is
            (A) 10   (B) -8   (C) 6   (D) 8

3)   In figure ,If OP||RS, ∠OPQ = 110° and ∠QRS = 130°, then ∠ PQR is equal to
            (A) 40°   (B) 50°   (C) 60°   (D) 70°

4) In figure , ∠AOB = 90° and ∠ABC = 30°, then ∠CAO is equal to: (A) 30°   (B) 45°   (C) 90°   (D) 60°

5) The sides of a triangle are 35 cm, 54 cm and 61 cm, respectively. The length of its longest altitude
            (A) $16\sqrt{5}$ cm   (B) $10\sqrt{5}$ cm   (C) $24\sqrt{5}$ cm   (D) 28 cm

6) The radii of two cylinders are in the ratio of 2:3 and their heights are in the ratio of 5:3. The ratio of their volumes

    is: (A) 10 : 17   (B) 20 : 27   (C) 17 : 27   (D) 20 : 37   OR

    The total surface area of a cone whose radius is $\frac{r}{2}$ and slant height 2l is

            (A) $2\pi r\ (l + r)$ (B) $\pi r\ (l + \frac{r}{4}\ )$ (C) $\pi r\ (l + r)$ (D) $2\pi rl$

7) In a frequency distribution, the mid value of a class is 10 and the width of the class is 6. The lower limit
    of the class is :   (A) 6   (B) 7   (C) 8   (D) 12
    OR
    The width of each of five continuous classes in a frequency distribution is 5 and the lower class-limit of
    the lowest class is 10. The upper class-limit of the highest class is:
            (A) 15   (B) 25   (C) 35   (D) 40

8) The mean of 25 observations is 36. Out of these observations if the mean of first 13 observations is 32
    and that of the last 13 observations is 40, the 13th observation is :
            (A) 23   (B) 36   (C) 38   (D) 40

9) Two coins are tossed 1000 times and the outcomes are recorded as below :

No. of Heads	2	1	0
Frequency	200	550	250

Based on this information, the probability for at most one tail is (A) $\frac{1}{5}$ (B) $\frac{1}{4}$ (C) $\frac{4}{5}$ (D) $\frac{3}{4}$

10) In $\triangle$ PQR , $\angle P = 70°$, $\angle R = 30°$, Then :

(A) PQ > PR   (B) PQ > QR   (C) QR > PR   (D) PR > PQ

11) Give the equations of two lines passing through (2, 14). How many more such lines are there, and why?

12) Express 0.2353535………. in form of $\frac{p}{q}$.

13) Write rational & irrational number between $\sqrt{2}$ & $\sqrt{3}$.

14) Check whether the polynomial q(t) = $4t^3 + 4t^2 - t - 1$ is a multiple of 2t + 1.

15) Prove that there is only one mid point of a line segment .

16) The observations 29, 32, 48, 50, x, x + 2, 72, 78, 84, 95 have been arranged in ascending order. If the median of the data is 63, find the value of x.

17) In figure, $\angle PQR = 100°$, where P, Q and R are points on a circle with centre O. Find $\angle OPR$.
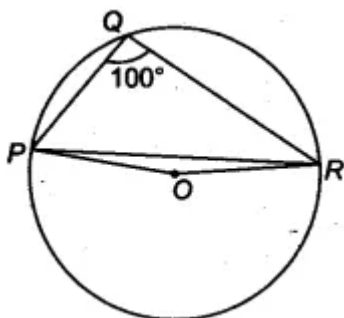
18) Which is greater : $\sqrt[3]{16}$ or $\sqrt[5]{8}$?   OR   If x = $3 + 2\sqrt{2}$, Find whether $x + \frac{1}{x}$ is rational or irrational

19) Locate $\sqrt{10}$ on number line.

20) Find the coordinate of point lie on y axis at distance 4 units from origin .   OR
Find the points where the graph of the linear equation 2x + 3y = 6 cuts the y-axis .

SECTION – B

21) Factorise : $x^3 + 13 x^2 + 32 x + 20$ OR $2\sqrt{2} a^3 + 8b^3 - 27c^3 + 18 \sqrt{2}$ abc.

22) The parking charges of a car in a parking lot are Rs 20 for the first hour & Rs 10 for the subsequent hours. Taking total parking time to be x hours & total charges as Rs y, write a linear equation in two variables to express the above statements.

23) A closed cylindrical petrol storage tank that is 4.2m in diameter and 4.5 m high. How much steel was actually used, if $\frac{1}{12}$th of the steel actually used was wasted in making the tank.

 OR

A metal pipe is 77 cm long. The inner diameter of a cross section is 4cm, the outer diameter being 4.4 cm. Find its total surface area.

24) POQ is a line . Ray OR is perpendicular to line PQ. OS is another ray lying between rays OP & OR. Prove that

$\llcorner$ ROS = $\frac{1}{2}$ ($\llcorner$ QOS - $\llcorner$ POS).

25) ABCD is a trapezium with AB || DC. A line parallel to AC intersects AB at X and BC at Y. Prove that ar (ADX) = ar (ACY).

26) Bisectors of angles interior angles B and C of a triangle ABC intersect each other at the point O. Prove that $\angle BOC = 90° + \dfrac{1}{2}\angle A$.

<div align="center">Section – C</div>

27) Two solid spheres made of the same metal have weights 5920 g and 740 g, respectively. Determine the radius of the larger sphere, if the diameter of the smaller one is 5 cm.

28) State & Prove Mid Point Theorem .   OR

In a parallelogram ABCD, E and F are the mid-points of sides AB and CD respectively (Fig.). Show that the line segments AF and EC trisect the diagonal BD.

29) Prove that isosceles trapezium is cyclic   OR

If two equal chords of a circle intersect within the circle, prove that the segments of one chord are equal to corresponding segments of the other chord.

30) Draw the Histogram for the data :

| Age (years)	1 -2	2-3	3-5	5-7	7-10	10-15	15-17
children	5	3	6	12	9	10	4

31) Construct a triangle ABC, in which $\angle B = 60°$, $\angle C = 45°$ and AB + BC + CA = 11 cm.

32) Given that $px^2 + qx + 6$ leaves the remainder 1 on division by (2x +1) & $2qx^2 + 6x + p$ leaves the remainder 2 on division by (3x - 1). Find p & q.   OR

The polynomials $ax^3 - 3x^2 + 2x - 3$ and $ax^2 - 5x + a$ when divided by x−2 leave remainders of p and q respectively. Find the value of a if p=3q. Hence find value of p & q .

33) The triangular side walls of a flyover have been used for advertisements. The sides of the walls are 13 m, 14 m and 15 m. The advertisements yield an earning of Rs 2000 per m^2 a year. A company hired one of its walls for 6 months. How much rent did it pay?   OR

Students of a school staged a rally for cleanliness campaign. They walked through the lanes in two groups. One group walked through the lanes AB, BC and CA; while the other through AC, CD and DA (see Fig. 12.12). Then they cleaned the area enclosed within their lanes. If AB = 9 m, BC = 40 m, CD = 15 m, DA = 28 m and ∟B = 90º, which group cleaned more area and by how much? Find the total area cleaned by the students (neglecting the width of the lane.

34) Find the values of a & b :   Find value of a & b if , $\dfrac{(7+\sqrt{5})}{(7-\sqrt{5})} - \dfrac{(7-\sqrt{5})}{(7+\sqrt{5})} = a + \dfrac{7}{11}\sqrt{5}\, b$.

<div align="center">OR</div>

Simplify $\dfrac{6}{2\sqrt{3}-\sqrt{6}} + \dfrac{\sqrt{6}}{\sqrt{3}+\sqrt{2}} - \dfrac{4\sqrt{3}}{\sqrt{6}-\sqrt{2}}$.

<div align="center">Section– D</div>

35) A dome of a building is in the form of a hemisphere. From inside, it was white-washed at the cost of ₹498.96. If the cost of white-washing is ₹2.00 per square metre, find the (i) inside surface area of the dome, (ii) volume of the air inside the dome.

36) In fig.Diagonals AC & BD of a quadrilateral ABCD intersect at O such that OB = OD . If AB = CD , Show that : a) Ar (ΔAOB)= Ar(ΔDOC)   b) Ar (ΔACB)= Ar(ΔDCB)   c)ABCD is a IIgm .
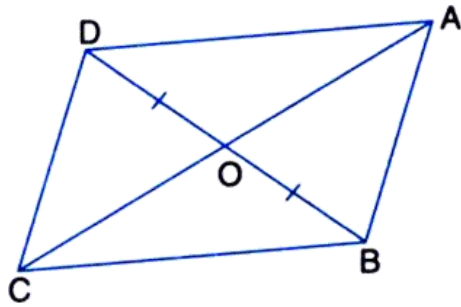
OR

ABCD is a trapezium in which AB || DC, DC = 30 cm and AB = 50 cm. If X and Y are, respectively the mid-points of AD and BC, prove that ar (DCYX) = $\frac{7}{9}$ ar (XYBA) .

37) i)If PR>PQ & PS bisects ∠ QPR in triangle PQR. Prove that ∠ PSR > ∠ PSQ. Also Prove that ∟PSR > 90°.

ii) In right angled triangle , Prove that line segment joining the mid points of the hypotenuse to opposite vertex is half the hypotenuse .
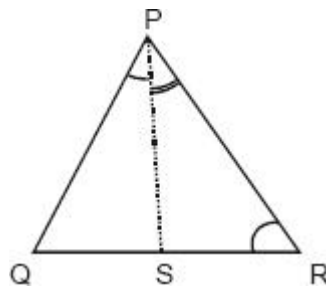
38) If two chords AB and CD of a circle AYDZBWCX intersect at right angle), prove that arc CXA + arc DZB = arc AYD + arc BWC = semicircle.
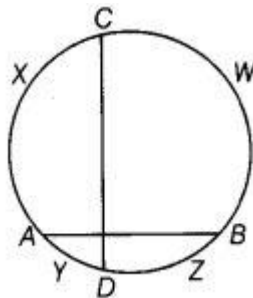
OR

Three girls Reshma, Salma and Mandip are playing a game by standing on a circle of radius 5m drawn in a park. Reshma throws a ball to Salma, Salma to Mandip, Mandip to Reshma. If the distance between Reshma and Salma and between Salma and Mandip is 6m each, what is the distance between Reshma and Mandip?

39) Prove that the quadrilateral formed by the bisectors of the angles of a parallelogram is a rectangle .

40) If $\dfrac{9^n \times 3^2 \times 3^{(-n/2)^{-2}} - 27^n}{3^{3m} \times 2^3} = \dfrac{1}{27}$, Prove that m − n = 1.