PAPER 2
CLASS 9

General Instructions:

1. This question paper contains 38 questions.
2. This question paper is divided into 5 sections A, B, C, D and E.
3. In Section A, Questions 1 – 18 are multiple choice questions (MCQs) and question number 19 and 20 are Assertion – Reason based questions of 1 mark each.
4. In Section B, Questions 21 – 25 are very short answer (VSA) type questions, carrying 02 marks each.
5. In Section C, Questions 26 – 31 are short answer (SA) type questions, carrying 03 marks each.
6. In Section D, Questions 32 – 35 are long answer (LA) type questions, carrying 05 marks each.
7. In Section E, Question number 36 – 38 are case study based questions, carrying 4 marks each with sub parts of the values 1, 1 and 2 marks each respectively.
8. All questions are compulsory. However, an internal choice in 2 questions of Section B, 2 questions of Section C and 2 questions of Section D has been provided. An internal choice has been provided in all the 2 marks questions of Section E.
9. Draw neat and clean figures wherever required.
10. Take $\pi = \frac{22}{7}$, wherever required if not stated.
11. Use of calculators is not allowed.

Section – A

Section A consists of 20 questions of 1 mark.

1. The value of $\left[(16)^{\frac{1}{2}}\right]^{\frac{1}{2}}$ is:

   a. 2   b. 4   c. 8   d. $\frac{1}{2}$

2. $-\frac{\sqrt{28}}{\sqrt{343}}$ is a _____ number.

a. a natural
b. an integer
c. an irrational
d. a rational

3. If the polynomial $p(x) = 3x^4 - 4x^3 - 3x - 1$ is divisible by $(x - 1)$, then the remainder is:

   a. 3   b. -4 c. -5 d. -1

4. The value of $(15)^3 + (-8)^3 + (-7)^3$ is:

   a. -840 b. -2520 c.   1680   d.   2520

5. The perpendicular distance of the point $P(5, 7)$ from the $y - axis$ is:

   a. 5   b.   7   c.   2   d.   12

6. Abscissa of all the points on the $x - axis$ is:

   a. 0   b.   1   c.   ordinate   d.   any number

7. The equation of $x - axis$ is:

   a. $y = b$ b. $y - 0$ c. $x = a$ d. $x = 0$

8. The linear equation $5y - 3 = 0$, represented as $ax + by + c = 0$, has:

a. a unique solution

b. two solutions

c. no solution

d. infinitely many solutions

9. There are _____ number of Euclid's postulates.

a. four

b. seven

c. five

d. six

10. In the given figure, find the value of x.
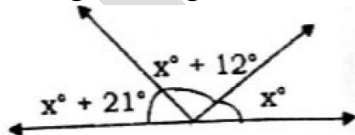
   a. $71°$ b. $39°$ c. $49°$ d. $59°$

11. In the given figure, $\angle ABC = 69°, \angle ACB = 31°$. Find the value of $\angle BDC$.
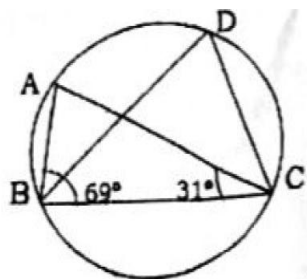
a. 100°   b.   90°   c.   60°   d.   80°

12. It is given that $\Delta ABC \cong \Delta FDE$ and AB = 5 cm, $\angle B = 40°$ and $\angle A = 80°$.
    Then, which of the following is true?

a. DF = 5 cm, $\angle F = 60°$

b. DF = 5 cm, $\angle E = 60°$

c. DE = 5 cm, $\angle E = 60°$

d. DE = 5 cm, $\angle D = 40°$

13. In a parallelogram ABCD, if $A = 60°$, then $\angle D$ is equal to:

a. 110°   b.   140°   c.   120°   d.   130°

14. If the measure of an angle is twice the measure of its complementary angle, then the measure of the angle is:

a. 60°   b.   45°   c.   90°   d.   30°

15. If the semi – perimeter of a scalene triangle is 36 cm, then its perimeter is:

a. 16 cm   b.   18 cm   c.   72 cm   d.   62 cm

16. Area of a equilateral triangle of each side $2a$ units is _____ sq. units.

a. $\frac{\sqrt{3}}{4}a^2$ b. $\frac{\sqrt{3}}{2}a^2$ c. $\sqrt{3}a^2$ d. $2\sqrt{3}a^2$

17. Surface area of a sphere of diameter d cm is _____ sq. cm.

a. $\frac{1}{2}\pi d^2$ b. πd^2 c. $4\pi d^2$ d. $\frac{1}{4}\pi d^2$

18. The class width of the class intervals 10 – 19, 20 – 29, 30 – 39 is:

a. 10   b.   9   c. -9 d. -10

Directions: In 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): The slant height of a cone is 34 cm and base diameter is 32 cm, then the height of the cone is 30 cm.
Reason (R): Formula for the curved surface area of a cone is $\pi r l$ sq. units, where r and l are radius and slant height respectively.

20. Assertion (A): In the given figure, ABCD is a cyclic quadrilateral in which $\angle A = (2x + 40)°$ and $\angle C = (3x + 20)°$, then the value of x is 24°.
Reason (R): Opposite sides of a cyclic quadrilateral are equal.

Section – B
Section B consists of 5 questions of 2 marks each.

21. Identify the following as rational or irrational numbers:
a. $\sqrt{1.44}$ b.   0.3967   c. $\left(7 + \sqrt{2}\right) - \left(4 + \sqrt{2}\right)$ d. $\sqrt{55}$

22. If a point C lies between two points A and B such that AC = BC, then prove that AC $= \frac{1}{2}$ AB. Explain by drawing the figure.

OR

Write any two Euclid's axioms.

23. In which quadrant or on which axis do the following points lie?
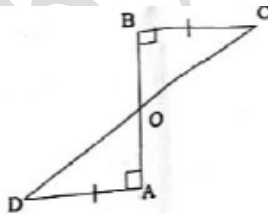a. $(-2, 3)$ b. $(0, 7)$ c. $(-4, -4)$ d. $(8, -1)$

24. The height of a cone is 15 cm. If its volume is 1570 cm³, find the radius of the base. ($Use\ \pi = 3.14$)

OR

The diameter of the moon is approximately one – fourth of the diameter of the earth. What fraction of the volume of the earth is the volume of the moon?

25. In the given figure, AD and BC are equal perpendiculars to a line segment AB. Show that CD bisects AB.

Section – C
Section C consists of 6 questions of 3 marks each.

26. If $p = \frac{\sqrt{3} - \sqrt{2}}{\sqrt{3} + \sqrt{2}}$ and $q = \frac{\sqrt{3} + \sqrt{2}}{\sqrt{3} - \sqrt{2}}$, then find the value of $(p + q)^2$.

27. Express $0.5\overline{7}$ in the form $\frac{p}{q}$, where p and q are integers and $q \neq 0$.

OR

Express $0.\overline{234}$ in the form $\frac{p}{q}$, where p and q are integers and $q \neq 0$.

28. Expand:
a. $(2a - b + c)^2$
b. $(2x - 3y)^3$

OR

Evaluate using identities:
a. 104×95
b. $(102)^3$

29. If $x = -3$ and $y = 2$ is the solution of the linear equation $3y = 2x + k$, then find the value of k. Also, find two more solutions of the given equation.

30. Prove that the line drawn through the centre of a circle to bisect a chord is perpendicular to the chord.

31. Find the values of k, if $(x + 1)$ is the factor of the polynomials:
a. $x^3 + kx^2 - 2x + k + 5$
b. $x^4 + k^2x^2 - 4k + 6x$

Section – D

Section D consists of 4 questions of 5 marks each.

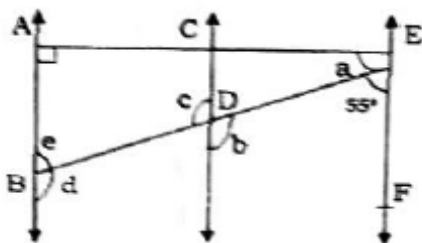32. Divide $3y^4 - 8y^3 - y^2 - 5y - 5$ by $(y - 3)$ and find the quotient and remainder.

OR

Verify that: $x^3 + y^3 + z^3 - 3xyz = \frac{1}{2}(x + y + z)[(x - y)^2 + (y - z)^2 + (z - x)^2]$.

33. Draw a histogram for the given data, marks scored by the students of class IX in mathematics test out of 80 marks.

Marks	$0 - 20$	$20 - 30$	$30 - 50$	$50 - 60$	$60 - 80$
No. of students	10	15	20	15	10

34. In the given figure, AB || CD and CD || EF. Also EF ⊥ AB. If $\angle BEF = 55°$, find the values of a, b, c, d and e.

35. ABCD is a quadrilateral in which P, Q, R and S are mid – points of the sides AB, BC, CD and DA. AC is a diagonal. Show that:

(i)   SR || AC and SR $= \frac{1}{2}$ AC

(ii)   PQ = SR

(iii)   PQRS is a parallelogram

OR

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

Section – E

Section E consists of 3 case study based questions of 4 marks each.

36. Students of class IX were explained about the concept and properties of triangles. For this purpose, Mr. Rohit a mathematics teacher has drawn a triangle on board and asked following questions based on the triangle.
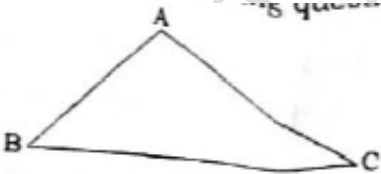
The sides of the triangle are in the ratio 13 : 12 : 5 and its perimeter is 450 m.

a. Find the semi – perimeter.
b. Find the sides of the triangle.
c. Find the area of the triangle.

37. Jeetraj has drawn a circle on board with centre O, where AB and CD are straight lines through the centre O of the circle and $\angle AOC = 80°$ and $\angle CDE = 40°$. He asks some questions based on the drawing.
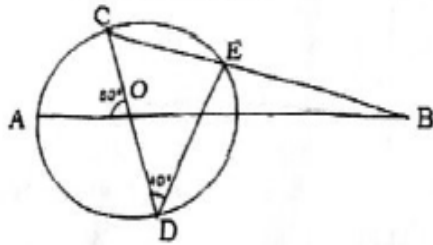
a. Find the measure of $\angle CED$.
b. Find the measure of $\angle DCE$.
c. Find the measure of $\angle ABC$.
38. Sherly has a piece of canvas whose area is 551 m². She uses it to have a conical tent made, with a base radius of 7 m. Assuming that all the stitching margins and the waste incurred while cutting, amounts to approximately 1 m².
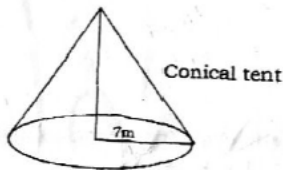
Conical tent

Based on the information above, answer the following:
a. What is the slant height of the conical tent?
b. Find the height of the tent.
c. What is the volume of the conical tent?