Roll No. | | | | | **DAV BORL PUBLIC SCHOOL, BINA**

SAMPLE PAPER : 2019 - 20

MATHEMATICS

CLASS – IX

TIME ALLOWED: 3 HRS **MAXIMUM MARKS: 80**

General Instructions:-

- **Please check that this question paper contains 30 questions and 2 printed pages.**
- The question paper consists of four sections: A, B, C and D
- Section A consists of 6 questions of 1 mark each.
- Section B consists of 6 questions of 2 mark each.
- Section C consists of 10 questions of 3 mark each.
- Section D consists of 8 questions of 4 mark each.
- All questions are compulsory.
- There is no overall choice. However, internal choices have been given in some questions.
- Use of calculator is not permitted.

SECTION – A

A Choose and write the correct option in each of the following questions.

1. Rationalising factor for the denominator of the expression $\frac{1}{3+\sqrt{5}}$ is

   (a) $3 + \sqrt{5}$ (b) $\sqrt{5} + 3$ (c) $\sqrt{3} + 5$ (d) $3 - \sqrt{5}$

2. If x + y = -4 and xy = 2, then the value of $x^2 + y^2$ is

   (a) 16 (b) 12 (c) 18 (d) - 2

3. The point which lies on the line y = 2x is

   (a) (- 2, -6) (b) (2, - 4) (c) (-5, - 10) (d) (-5, -10)

4. If one angle of a triangle is equal to the sum of the other two angles, then the triangle is

   (a) An isosceles triangle (b) an obtuse triangle
   (c) an equilateral triangle (d) a right triangle

5. Which of the following is not a criterion for congruence of triangles ?

   (a) SAS (b) ASA (C) SSA (d) SSS

6. A quadrilateral in which both pairs of opposite sides are parallel only is

   (a) Rectangle (b) square (c) parallelogram (d) rhombus

7. The area of the figure formed by joining the mid points of the adjacent sides of a rhombus with the diagonals 14 cm and 10 cm is

   (a) 45 cm^2 (b) 70 cm^2 (c) 35 cm^2 (d) 40 cm^2

8. If a circle is divided into eight equal parts, the angle subtended by each arc at the centre is equal to

   (a) 90^o (b) 60^o (c) 45^o (d) 30^o

9. The curved surface of the hemisphere is

   (a) πr^2 (b) $2\pi r^2$ (c) $3\pi r^2$ (d) $4\pi r^2$

10. Which of the following cannot be empirical probability of an event?
    (a) $\frac{4}{5}$ (b) 0 (c) 1 (d) $\frac{5}{4}$

The following questions consist of two statements – Assertion(A) and Reason(R). Answer these questions selecting the appropriate option given below:

(a) Both A and R are true and R is the correct explanation for A.
(b) Both A and R are true and R is not the correct explanation for A.
(c) A is true but R is false.
(d) A is false but R is true.

11. **Assertion (A) :** Two distinct intersecting lines cannot be parallel to the same line.
    Reason (R) : A line segment has two end points.
12. **Assertion (A) :**It is always possible to draw a triangle whose sides measure 4 cm, 5 cm, and 10 cm respectively.
    Reason (R) : In any triangle, the sum of any two sides must be greater than third side
13. **Assertion (A) :** A cyclic parallelogram is a square**.**
    Reason (R) : Diameter is the largest chord of the circle.
14. **Assertion (A) :** The area of an isosceles triangle having base 24 cm and each of the equal sides equal to 13 cm is 60 cm^2.
    Reason (R) : If 2s = a + b + c, where a, b, c are the sides of a triangle then the area of triangle by Heron`s formula.
15. **Assertion (A) :** The volume of two spheres are in the ratio 64 : 27. Then the ratio of their surface areas is 16 : 9.
    Reasons (R) : Curved surface area of hemi-sphere = $3\pi r^2$

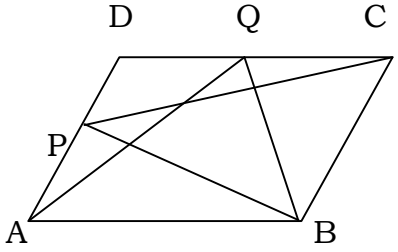
Fill in the blanks.

16. The coefficient of x^2 in the expansion $(x-1)^3$ is.....
17. The sum of any two sides of any triangle is greater than ---------- side.
18. In order to construct a triangle with given perimeter and two base angles, we start the construction by drawing a line of length equal to ----------
19. If the radius of the sphere is doubled, then its surface area becomes ---------- times
20. $\sum_{i=1}^{10} x_I$ can be written in expanded form as ----------

SECTION - B

21. If x = 2k – 1 and y = k is a solution of the equation 3x – 5y – 7 = 0, find the value of k.
22. If a point P be the mid- point of line segment AB, prove that AP = BP = $\frac{1}{2}$ AB
23. The following observations have been arranged in ascending order. If the median of the data is 23.5. Find the value of x.
    12, 16, 17, 19, x, x + 3, 27, 37, 38, 40
24. The diameter of a metallic ball is 4.2 cm. What is the mass of the ball if the density of metal is 8.9 g per cm^3?
25. A chord of a circle is equal to the radius of the circle. Find the angle subtended by the chord at a point on the minor arc .

26. P and Q are any two points lying on the sides DC and AD respectively of a parallelogram ABCD. Show that ar(ΔAQB) = ar(ΔBPC).



SECTION - C

27. Find the values of a and b if $\frac{3-\sqrt{5}}{3+2\sqrt{5}} = a\sqrt{5} - \frac{b}{11}$

28. The record of a weather station shows that out of the past 250 consecutive days, its weather forecasts were correct 175 times.
    (i) What is the probability that on a given day it was correct?
    (ii) What is the probability that it was not correct on a given day?

OR

The probability of guessing the correct answer to a certain question is $\frac{x}{2}$. If the probability of not guessing the correct answer to the question is $\frac{2}{3}$, then find x.

29. Factorise: $x^3 - 23x^2 + 142x - 120$.

30. Draw the graphs of 2x + y = 6 and 2x – y + 2 = 0. Shade the region bounded by these lines and x-axis.

31. A village, having a population of 4000, requires 150 litres of water per head per day. It has a tank measuring 20m × 15m × 6m. For how many days will the water of this tank last.

OR

A hemispherical bowl with radius 6 cm is filled with water. If the water is transferred into cylindrical vessel of base radius 3 cm, find the height to which the water rises in the cylindrical vessel.

32. Angles opposite to two equal sides of a triangle are equal.

OR

ABCD is a quadrilateral in which AB and CD are smallest and longest sides respectively. Prove that $\angle A > \angle C$ and $\angle B > \angle D$

33. A field is in the shape of a trapezium whose parallel sides are 25 m and 10 m. The non-parallel sides are 14 m and 13 m. Find the area of the field.

34. Construct a triangle XYZ in which $\angle Y = 30^o$, $\angle Z = 90^o$ and the perimeter of the triangle XYZ is 11 cm.

OR

Construct a triangle ABC in which BC = 7 cm, $\angle B = 75^o$ and AB + AC = 13 cm.

SECTION - D

35. Prove that the quadrilateral formed (if possible) by the internal angle bisectors of

any quadrilateral is cyclic.

36. If the polynomial $ax^3 + 4x^2 + 3x - 4$ and $x^3 - 4x + a$ leave the same remainder when divided by $(x - 3)$. Find the value of a.

37. XY is a line parallel to side BC of a triangle ΔABC. BE $\parallel AC$ and CF $\parallel$ AB meets XY at E and F respectiuvely. Show that ar(ΔABC) = ar(ΔACF).

38. The total surface area of a solid cylinder is 231 cm^2 and its curved surface area is $\frac{2}{3}$ of the total surface area. Find the volume of the cylinder.

OR

Find

(i) The lateral or curved surface area of a closed cylindrical petrol storage tank that is 4.2 m in diameter and 4.5 m high.

(ii) How much steel was actually used, if $\frac{1}{12}$ of the steel actually used was wasted in making the tank.

39. (i) Factorise $64a^3 - 27b^3 - 144a^2b + 108ab^2$

(ii) Prove that $x^3 + y^3 + z^3 = 3xyz$, if $x + y + z = 0$

40. Draw the frequency polygon for the following frequency distribution:

Class interval	0-9	10-19	20-29	30-39	40-49	50-59
Frequency	8	3	6	12	2	7