CBSE Class 9 Mathematics
Sample Paper -01 (2017-18)

General Instructions:

- All questions are compulsory.
- The question paper consists of 30 questions divided into four sections A, B, C and D.
- Section A contains 6 questions of 1 mark each. Section B contains 6 questions of 2 marks each. Section C contains 10 questions of 3 marks each. Section D contains 8 questions of 4 marks each.
- There is no overall choice. However, an internal choice has been provided in four questions of 3 marks each and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.
- Use of calculators is not permitted.

Section A
(Question numbers 1 to 6 carry 1 mark each)

1. If $x^{a/b}=1$, then find the value of ‘a’.
2. If $p(x) = 2x^3 + 5x^2 - 3x -2$ is divided by $x-1$, then find the remainder.
3. The distance of the point (0, -1) from the origin is ________.
4. If the vertical angle of an isosceles triangle is $100^0$, then find the measures of its base angles.
5. The ratio of the whole surface area of a solid sphere and a solid hemisphere is ___.
6. There are 60 boys and 40 girls in a class. A student is selected at random. Find the probability that student is a girl.

Section B
(Question numbers 7 to 12 carry 2 marks each)

7. If $p = 2- a$, then prove that $a^2 + 6a p + p^3 - 8 = 0$.
8. In the adjoining figure, we have $AB = BC$, $BX = BY$. Show that $AX = CY$(using appropriate Euclid's axiom)
9. If two opposite angles of a parallelogram are \((63 - 3x)°\) and \((4x - 7)°\). Find all the angles of the parallelogram.

10. Three Schools situated at P, Q and R in the figure are equidistant from each other as shown in the figure. Find \(\angle QOR\).

11. The diameter of the two right circular cones are equal if their slant heights are in the ratio 3 : 2, then what is the ratio of their curved surface areas?

12. A batsman in his 11th innings makes a score of 68 runs and there by increases his average score by 2. What is his average score after the 11th innings.

**Section C**

(Question numbers 13 to 22 carry 3 marks each)

13. Represent \(\sqrt{10}\) on the number line

14. Simplify: \(\frac{73 \times 73 \times 73 + 27 \times 27 \times 27}{73 \times 73 - 73 \times 27 + 27 \times 27}\)

15. Determine the point on the graph of the linear equation \(2x + 5y = 19\), whose ordinate is \(1 \frac{1}{2}\) times its abscissa.

16. Locate the points \((3, 0), (-2, 3), (2, -3), (-5, 4)\) and \((-2, -4)\) in Cartesian plane. Also find the quadrant in which they lie.

OR

Observe the fig. given below and answer the following:
i. The coordinates of B.
ii. The coordinates of C.
iii. The point identified by the coordinate (-3, -5).
iv. The abscissa of the point D.
v. The coordinates of H.
vi. The coordinates of origin

17. In figure, AC = AE, AB = AD and \( \angle BAD = \angle EAC \). Show that BC = DE.

OR

AB is a line segment and P is its mid-point. D and E are points on the same side of AB such that \( \angle BAD = \angle ABE \) and \( \angle EPA = \angle DPB \). Show that

i. \( \triangle DAP \cong \triangle EBP \)
ii. AD = BE
18. Show that the area of a rhombus is half the product of the lengths of its diagonals.

19. A, B, C and D are the four points on a circle. AC and BD intersect at point E such that $\angle \text{BEC} = 130^\circ$ and $\angle \text{ECD} = 20^\circ$. Find $\angle \text{BAC}$.

OR

Prove that equal chords of a circle subtend equal angles at the centre.

20. Sides of a triangle are in the ratio 12 : 17 : 25 and its perimeter is 540 cm. Find its area.

21. The diameter of a garden roller is 14 m and it is 2 m long. How much area will it cover in 10 revolutions?

OR

The sum of height and radius of the base of a solid cylinder is 37 cm. If the total surface area of the cylinder is 1628 cm$^2$, then find its volume.

22. Fifty seeds were selected at random from each 5 bags seeds and were kept under standardized conditions favorable to germination. After days, the number of seeds which had germinated in each collection were counted and recorded as follows:

<table>
<thead>
<tr>
<th>Bag</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of seeds generated</td>
<td>40</td>
<td>48</td>
<td>42</td>
<td>39</td>
<td>38</td>
</tr>
</tbody>
</table>

What is the probability of germination of
(i) More than 40 seeds in a bag
(ii) 49 seeds in a bag
(iii) More than 35 seeds in a bag

Section D
(Question numbers 23 to 30 carry 4 marks each)

23. If \( x = \frac{6 - \sqrt{32}}{2} \), then find the value of \( \left( x^3 + \frac{1}{x^3} \right) - 6 \left( x^2 + \frac{1}{x^2} \right) + \left( x + \frac{1}{x} \right) \).

OR

If \( x = \frac{\sqrt{3} + 1}{\sqrt{3} - 1}, \ y = \frac{\sqrt{3} - 1}{\sqrt{3} + 1}, \) find the value of \( x^2 + xy - y^2 \)

24. Determine the value of 'b' for which the polynomial \( 5x^3 - x^2 + 4x + b \) is divisible by \( 1-5x \).

25. Draw the graph of two lines whose equations are \( x + y - 6 = 0 \) and \( x - y - 2 = 0 \), on the same graph paper. Find the area of triangle formed by the two lines and y axis.

OR

The force exerted to pull a cart is directly proportional to the acceleration produced in the cart. Express the statement as a linear equation in two variables and draw the graph for the same by taking the constant mass equal to 6 kg.

26. In figure the sides AB and AC of are produced to points E and D respectively. If bisectors BO and CO of \( \angle CBE \) and \( \angle BCD \) respectively meet at point O, then prove that \( \angle BOC = 90^\circ - \frac{1}{2} \angle BAC \)

![Diagram](image)

27. In the adjoining figure, P is the point in the interior of a parallelogram ABCD. Show that \( \text{ar}(\ \triangle APB) + \text{ar}(\ \triangle PCD) = \frac{1}{2} \text{ar}(\ \parallel \text{gm} \ ABCD) \)
28. Construct a right angled triangle whose base is 5 cm and sum of its hypotenuse and other side is 8 cm.

29. The floor of a rectangular hall has a perimeter 300 cm. Let the cost of painting of four walls at the rate of Rs. 12 per cm$^2$ is Rs. 24,000, then find the height of the hall.

30. The marks obtained (out of 100) by a class of 80 students are given below:

<table>
<thead>
<tr>
<th>Marks</th>
<th>Number of students</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-20</td>
<td>6</td>
</tr>
<tr>
<td>20-30</td>
<td>17</td>
</tr>
<tr>
<td>30-50</td>
<td>15</td>
</tr>
<tr>
<td>50-70</td>
<td>16</td>
</tr>
<tr>
<td>70-100</td>
<td>26</td>
</tr>
</tbody>
</table>

Construct a histogram to represent the data above.

OR

Construct a frequency polygon for the following data:

<table>
<thead>
<tr>
<th>Age (in years)</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-2</td>
<td>4</td>
</tr>
<tr>
<td>2-4</td>
<td>7</td>
</tr>
<tr>
<td>4-6</td>
<td>12</td>
</tr>
<tr>
<td>6-8</td>
<td>5</td>
</tr>
<tr>
<td>8-10</td>
<td>2</td>
</tr>
</tbody>
</table>