KENDRIYA VIDYALAYA SANGATHAN, HYDERABAD REGION
SAMPLE PAPER 01 FOR PERIODIC TEST II EXAM (2017-18)

SUBJECT: MATHEMATICS(041)

BLUE PRINT FOR HALF YEARLY EXAM: CLASS IX

<table>
<thead>
<tr>
<th>Chapter</th>
<th>VSA (1 mark)</th>
<th>SA – I (2 marks)</th>
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MARKING SCHEME FOR HALF YEARLY EXAM

<table>
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<td>GRAND TOTAL</td>
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KENDRIYA VIDYALAYA SANGATHAN, HYDERABAD REGION
SAMPLE PAPER 01 FOR PERIODIC TEST II EXAM (2017-18)

SUBJECT: MATHEMATICS MAX. MARKS : 80
CLASS : IX DURATION : 3 HRS

General Instructions:
(i). All questions are compulsory.
(ii). This question paper contains 30 questions divided into four Sections A, B, C and D.
(iii). Section A comprises of 6 questions of 1 mark each. Section B comprises of 6 questions of 2 marks each. Section C comprises of 10 questions of 3 marks each and Section D comprises of 8 questions of 4 marks each.
(iv). Use of Calculators is not permitted

SECTION – A

1. State “PLAYFAIR” axiom.

2. Rationalize the denominator of $\frac{3 - \sqrt{2}}{3 + \sqrt{2}}$.

3. Find the value of $k$, if $x = 2, y = 1$ is a solution of the equation $2x + 3y = k$.

4. One of the angles of a triangle is $50^\circ$ and the other two angles are equal. Find the measure of each of the equal angles.

5. If $x + 6$ is a factor of $p(x) = x^3 + 3x^2 + 4x + k$, find the value of $k$.

6. Write the coordinates of the point lying on x-axis and with x-coordinate 4.

SECTION – B

7. Show that $1.272727\ldots$ can be expressed in the form of $\frac{p}{q}$, where $p$ and $q$ are integers and $q \neq 0$.

8. In the below figure, if AB || CD, $\angle APQ = 50^\circ$ and $\angle PRD = 127^\circ$, find $x$ and $y$.

![Diagram showing angles](image)

9. The angles of quadrilateral are in the ratio $3 : 5 : 9 : 13$. Find all the angles of the quadrilateral.

10. ABCD is a parallelogram, AE $\perp$ DC and CF $\perp$ AD. If AB = 16 cm, AE = 8 cm and CF = 10 cm, find AD.

11. $\triangle ABC$ is right angled in which $\angle A = 90^\circ$ and AB = AC. Find $\angle B$ and $\angle C$. 

Prepared by: M. S. KumarSwamy, TGT(Maths)
12. Factorise: \( 27x^3 - \frac{1}{216} - \frac{9}{2}x^2 + \frac{1}{4}x \)

SECTION – C

13. From the figure, find the coordinates of A, B, C, D, E and F. Which of the points are mirror image in (i) x – axis (ii) y – axis

14. If \( x = \frac{\sqrt{3} + \sqrt{2}}{\sqrt{3} - \sqrt{2}} \), find \( x^2 + \frac{1}{x^2} \)

15. If \( a \) and \( b \) are rational numbers and \( \frac{7 - 4\sqrt{3}}{7 + 4\sqrt{3}} = a + b\sqrt{3} \), find the values of \( a \) and \( b \).

16. 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.

17. Show that the diagonals of a parallelogram divide it into four triangles of equal area.

18. In the below figure, ABCD is a parallelogram and AP and CQ are perpendiculars from vertices A and C on diagonal BD. Show that (i) \( \triangle APB \cong \triangle CQD \) (ii) \( AP = CQ \)

19. The Autorikshaw fare in a city is charged Rs 10 for the first kilometer and @ Rs 4 per kilometer for subsequent distance covered. Write the linear equation to express the above statement. Draw the graph of the linear equation.
20. Without actual division, prove that $2x^4 - 5x^3 + 2x^2 - x + 2$ is divisible by $x^2 - 3x + 2$.

21. Line $l$ is the bisector of an angle $\angle A$ and $B$ is any point on $l$. BP and BQ are perpendiculars from $B$ to the arms of $\angle A$ (see the below figure). Show that:
   
   (i) $\triangle APB \cong \triangle AQB$ (ii) $BP = BQ$ or $B$ is equidistant from the arms of $\angle A$.

22. In the above sided figure, if $QT \perp PR$, $\angle TQR = 40^\circ$ and $\angle SPR = 30^\circ$, find $x$ and $y$.

   ![Diagram](image)

23. Simplify $\frac{4 + \sqrt{5}}{4 - \sqrt{5}} + \frac{4 - \sqrt{5}}{4 + \sqrt{5}}$ by rationalizing the denominator.

24. If in two right triangles, hypotenuse and one side of a triangle are equal to the hypotenuse and one side of other triangle, prove that the two triangles are congruent.

25. Solve the equation $2x + 1 = x - 3$, and represent the solution(s) on
   
   (i) the number line,
   
   (ii) the Cartesian plane.

26. The polynomial $f(x) = x^4 - 2x^3 + 3x^2 - ax + b$ when divided by $(x - 1)$ and $(x + 1)$ leaves the remainders 5 and 19 respectively. Find the values of $a$ and $b$. Hence, find the remainder when $f(x)$ is divided by $(x - 3)$.

27. ABCD is a rectangle and $P$, $Q$, $R$ and $S$ are mid-points of the sides $AB$, $BC$, $CD$ and $DA$ respectively. Show that the quadrilateral $PQRS$ is a rhombus.
28. In the below figure, P is a point in the interior of a parallelogram ABCD. Show that

(i) \( \text{ar} \ (APB) + \text{ar} \ (PCD) = \frac{1}{2} \ \text{ar} \ (ABCD) \)

(ii) \( \text{ar} \ (APD) + \text{ar} \ (PBC) = \text{ar} \ (APB) + \text{ar} \ (PCD) \)

![Parallelogram ABCD with point P]

29. Plot the following points on a graph paper:

<table>
<thead>
<tr>
<th>x</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>y</td>
<td>5</td>
<td>8</td>
<td>11</td>
<td>14</td>
<td>17</td>
</tr>
</tbody>
</table>

Join these points. What do you observe?

30. In the above sided figure, the sides AB and AC of a triangle ABC 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 \( \angle BOC = 90^\circ - \frac{1}{2} \angle BAC \).

![Triangle ABC with points E and D and bisectors BO and CO meeting at O]