Class – IX
Mathematics

Time: 3hours   **Max Marks: 80**

General Instructions:

1. *All questions are compulsory.*
2. *The question paper consists of 25 questions divided into three sectionsA,B&C.*
   Section A contains 7 questions of 2 marks each.
   Section B is of 12 questions of 3 marks each and section C is of 6 questions of 5 marks each.
3. *Use of calculator is not permitted.*

SECTION – A
(Each question carries 2 marks)

1. Factorize: $16x - 54x^4$
2. Using Remainder Theorem, find the remainder when $2x^3 - 3x^2 - 7x + 2$ is divided by $5 + 2x$.
3. Evaluate 99^3 using a suitable identity.
4. A right triangle ABC with sides 5cm,12cm and 13 cm is revolved about the side 12 cm. Find the volume of the solid so formed.
5. Find the volume of a sphere whose surface area is 154 cm^2.
6. If the mean of five observations $x, x+2, x+4, x+6$ and $x+8$ is 11. find the mean of the first three observations.
7. A die is thrown 100 times, and the number of times each number turned up is recorded in the following table.

No. on the die	1 2 3 4 5 6
Frequency	15 18 16 14 19 18

Find the probability that the number turned up is a prime number.

SECTION-B
(Each question carries 3 marks)

8. Express the following with a rational denominator:

$$\frac{15}{\sqrt{10} + \sqrt{20} + \sqrt{40} - \sqrt{5} - \sqrt{80}}$$

9. Visualize $4.\overline{26}$ on the number line using successive magnification, upto 4 decimal places.
10. If $ax^2 + bx + x - 6$ has $x+2$ as a factor and leaves a remainder 4 when divided by $x-2$, find the values of a and b.
11. Represent the following points on a Cartesian plane.
   (a) (-1,2)   (b) (1,1)   (c) (3,-2)   (d) (-2,-3)   (e) (2,0)   (f) (0,-3)   (g) (0,2)   (h) (-3,0)
12. The taxi fare in a city is as follows:
   For the first kilometre the fare is Rs 8 and for the subsequent distance.it is Rs 5 per km. Taking the distance covered as x km and total fare as Rs y, write a linear equation for this information and draw its graph.

13. Solve the equation $(2+3x)/4=4-x$, and represent the solution on (i) the number line (2) Cartesian plane.

14. Draw the graph of the equation $x/3 +y/4 =1$. Also find the area of triangle formed by the line and the axes of coordinates.

15. In $\triangle ABC$, BE is the bisector of angle ACD. Prove that angle BEC = ½ angle A.
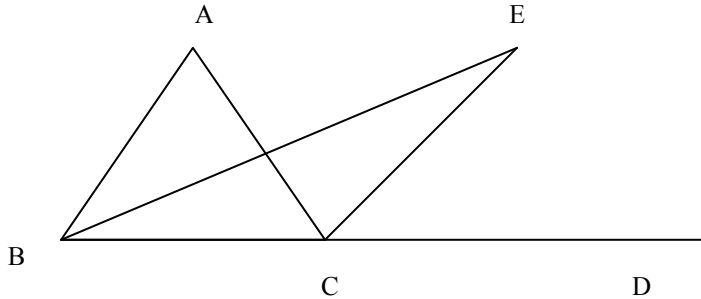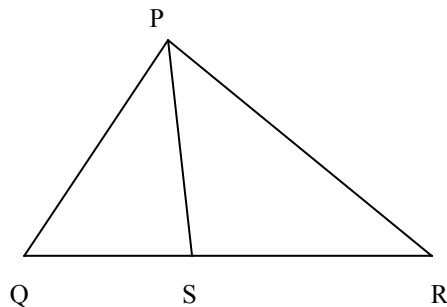

16. ABCD is a rhombus and AB is produced to E and F such that AE=AB=AF. Prove that ED and FC are perpendicular to each other.

17. ABCD is a quadrilateral in which AB is the smallest side and CD is the longest side. Show that angle A > angle C and angle B > angle D.
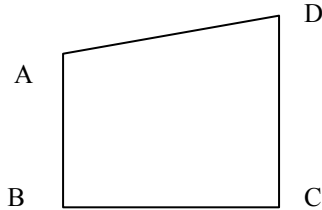
OR

In the fig., PR>PQ and PS bisects angle QPR. Prove that angle PSR > angle PSQ.

18. Prove that the line segment joining the midpoint of the hypotenuse of a right angled triangle to the vertex of the right angle is half of the hypotenuse.

19. Find the value of p if the mean of the following distribution is 14.5

x	12	13	14	15	16	17
f	6	8	5	p	9	5

SECTION C

20. Prove that the angle subtended by an arc at the centre is double the angle subtended by it at any point on remaining part of the circle.

Using this prove that the angle subtended by a minor arc in the alternate segment is obtuse.

OR

Prove that two triangles are congruent if two angles and included side of one triangle are equal to two angles and included side of the other triangle.

   21.Factorize the following :

     (a) $x^3 + 13x^2 + 32x + 20$

     (b) $x^3 + 1/x^3 - 2$

  22. Construct $\triangle PQR$ in which angle $Q = 60^0$, angle $R = 45^0$ and PQ+QR+RS=11cm.Also write the steps of construction.

  23. Find the area of a quadrilateral ABCD whose sides in metres are 9, 40, 28, 15 respectively and the angle between the first two sides is a right angle.

  24. It costs Rs.2200 to paint the inner curved surface of a cylindrical vessel 10m deep. If the cost of painting is at the rate or Rs. 20 per m^2,find the

(i) Inner curved surface area of the vessel.

(ii) Radius of the base.

(iii) Capacity of the vessel.

  25. A random survey of the number of children of various age groups playing in a park are found as follows :

Age in years	No.of children
1-2	5
2-3	3
3-5	6
5-7	12
7-10	9
10-15	10
15-17	4