



# ST. MARGARET SR. SEC. SCHOOL

## MID TERM SAMPLE PAPER SESSION-2024-25 SUBJECT: MATHEMATICS CLASS: IX

Time: 3Hr

M.M: 80

### General Instructions :

1. This question Paper has 5 Section A-E.
2. Section A has 20 MCQs carrying 1 mark each.
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. section D has 4 questions carrying 05 marks each.
6. Section E has 3 case based integrated units of assessment (04 marks each) with subparts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2marks questions of Section E.
8. Draw neat figures wherever required. Take  $\pi = 22/7$  wherever required if not stated.

### SECTION-A

1. The rational number  $0.\overline{3}$  can also be written as :  
a) 0.3                      b)  $\frac{3}{10}$                       c) 0.33                      d)  $\frac{1}{3}$
2. If in  $\Delta PQR$ ,  $PQ=PR$  then :  
a)  $\angle P = \angle R$               b)  $\angle P = \angle Q$               c)  $\angle Q = \angle R$               d) None
3. The zero of the polynomial  $p(x) = 2x + 5$  is :  
a) 2                              b) 5                              c)  $\frac{2}{5}$                               d)  $-\frac{5}{2}$
4. If  $AB=x+3$ ,  $BC=2x$ ,  $AC=4x-5$ , then for what values of 'x', B lies on AC?  
a) 2                              b) 3                              c) 5                              d) 8
5.  $(-5 + 2\sqrt{5} - \sqrt{5})$  is  
a) an irrational number              b) a positive rational number  
c) a negative rational number              d) an integer
6. Intersecting lines cut each other at :  
a) one point              b) Two points              c) Three points              d) Null
7. A rational number between  $\sqrt{2}$  and  $\sqrt{3}$  is :  
a) 1.5                              b) 1.8                              c)  $(\sqrt{2}, \sqrt{3})/2$                               d) 1.9
8. Two complementary angles are such that two times the measure of one is equal to three times the measure of the other. The measure of the smaller angle is  
a)  $30^\circ$                               b) None of these  
c)  $36^\circ$                               d)  $45^\circ$
9. Which of the following cannot be the angles of a triangle.  
a)  $30^\circ, 60^\circ, 90^\circ$               b)  $50^\circ, 60^\circ, 70^\circ$               c)  $40^\circ, 50^\circ, 100^\circ$               d)  $45^\circ, 45^\circ, 90^\circ$
10. Ordinate of all the points in the x-axis is :  
a) 0                              b) 1                              c) -1                              d) any natural number
11. Identify the polynomial :  
a)  $x^2 + 5\sqrt{x} + 7$               b)  $x^{-2} + x^{-1} + 5$               c)  $3x^2 + 7$                               d)  $\frac{1}{x^3} + 7$
12. Things which are double of the same thing area :  
a) equal                              b) unequal  
c) halves of the same thing              d) double of the same thing
13. Points (1, -2), (1, -3), (-4, 5), (0, 0)  
a) lie in III quadrant                              b) lie in II quadrant

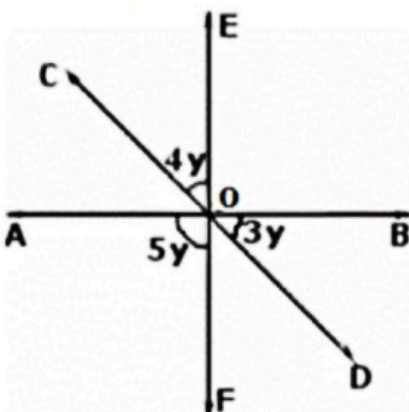
c) Do not lie in same quadrant

d) Lie in IV quadrant

14. The number of dimensions, a solid has  
a) 1                      b) 2                      c) 3                      d) 0
15. The area of triangle is  $150 \text{ cm}^2$  and its sides are in the ratio 3:4:5. What is its perimeter?  
a) 10 cm                      b) 30 cm                      c) 45 cm                      d) 60 cm
16. In  $\triangle ABC$ ,  $BC=AB$  and  $\angle B = 80^\circ$ . Then  $\angle A$  is equal to :  
a)  $80^\circ$                       b)  $40^\circ$                       c)  $50^\circ$                       d)  $100^\circ$
17. If  $x+2$  is a factor of  $x^2 + mx + 14$ , then  $m=$   
a) 2                      b) 9                      c) 7                      d) 14
18. If the perimeter of an equilateral triangle is 60 cm, then what is its area?  
a)  $200\sqrt{2} \text{ cm}^2$                       b)  $100\sqrt{2} \text{ cm}^2$                       c)  $100\sqrt{3} \text{ cm}^2$                       d)  $200\sqrt{3} \text{ cm}^2$
19. **Assertion (A)** : The point (0, 4) lies on y-axis.  
**Reason (R)** : The x-coordinate of the point on y-axis is zero.  
a) Both A and R are true and R is the correct explanation of A.  
b) Both A and R are true but R is not the correct explanation of A.  
c) A is true but R is false  
d) A is false but R is true
20. **Assertion (A)** : The side of an equilateral triangle is 6 cm then the area of the triangle is  $9 \text{ cm}^2$   
**Reason (R)** : All the sides of an equilateral triangle are equal.  
a) Both A and R are true and R is the correct explanation of A.  
b) Both A and R are true but R is not the correct explanation of A.  
c) A is true but R is false  
d) A is false but R is true

### SECTION-B

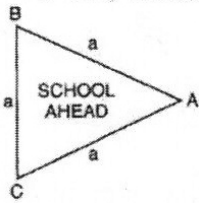
21. Using factor theorem, show that  $g(x)$  is a factor of  $p(x)$ , when  
 $p(x) = 2x^4 + 9x^3 + 6x^2 - 11x - 6$ ,  $g(x) = x - 1$ .
22. Simplify :  
$$\left(\frac{81}{16}\right)^{-\frac{3}{4}} x \left[ \left(\frac{25}{9}\right)^{-\frac{3}{2}} \div \left(\frac{5}{2}\right)^{-3} \right]$$
23. Factorise :  $a^3 - 2\sqrt{2}b^3$   
OR  
Factorise :  $x^4 + x^2y^2 + y^4$
24. In fig, determine the value of  $y$ .



25. If a point C lies between two points A and B such that  $AC=BC$ , then prove that  $AC = \frac{1}{2}AB$ . Draw figure also.

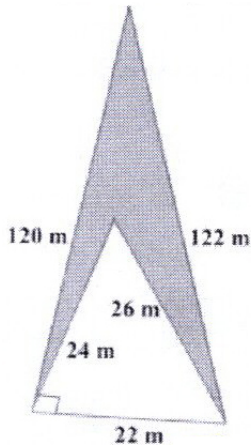
**SECTION-C**

26. Factorize the polynomial :  
 $25x^2 + 16y^2 - 4z^2 - 40xy + 16yz - 20xz$
27. A traffic signal board, indicating SCHOOL AHEAD is an equilateral triangle with side A. Find the area of the signal board, using Heron's formula. If its perimeter is 180cm, what will be the area of the signal board?

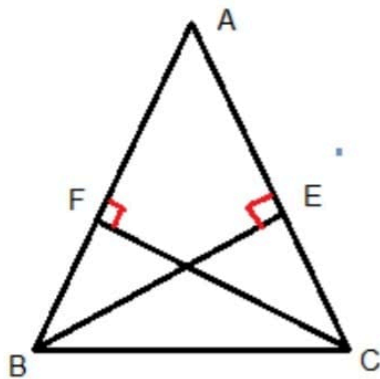


OR

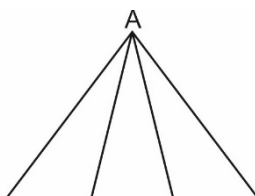
Calculate the area of the shaded region in Fig.



28. Locate  $\sqrt{3}$  on the number line.
29. If two parallel lines are intersected by a transversal, then bisectors of any two corresponding angles are parallel.
30. In fig, AD and BE are respectively altitudes of  $\Delta ABC$  such that  $AE = BD$ . Prove that  $AD=BE$ .

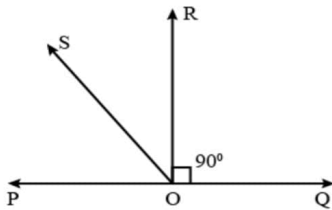


31. In fig. D and E are points on side BC of  $\Delta ABC$  such that  $BD=CE$  and  $AD=AE$ . Show that  $\Delta ABD \cong \Delta ACE$ .



**SECTION-D**

32. POQ is a line. Ray OR is perpendicular to line PQ. OS is another ray lying between rays OP and OR. Prove that  $\angle ROS = \frac{1}{2}(\angle QOS - \angle POS)$ .

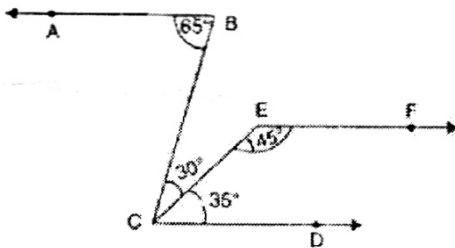


33. If  $a = \frac{\sqrt{2}+1}{\sqrt{2}-1}$  and  $b = \frac{\sqrt{2}-1}{\sqrt{2}+1}$ , then find the value of  $a^2 + b^2$ .

OR

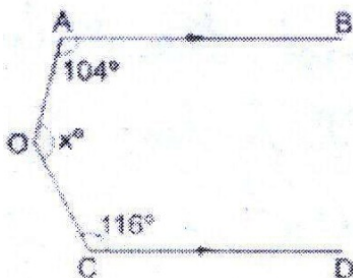
Find the values of a and b if  $\frac{\sqrt{2}+\sqrt{3}}{3\sqrt{2}-2\sqrt{3}} = a - b\sqrt{6}$

34. In figure  $\angle ABC = 65^\circ$ ,  $\angle BCE = 30^\circ$ ,  $\angle DCE = 35^\circ$  and  $\angle CFE = 145^\circ$ . Prove that  $AB \parallel FE$ .



OR

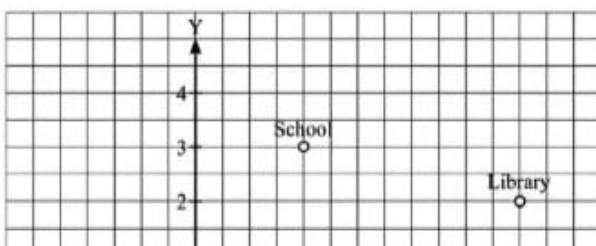
In the given figure,  $AB \parallel CD$  and  $\angle AOC = x^\circ$ . If  $\angle OAB = 104^\circ$  and  $\angle OCD = 116^\circ$ , find the value of x.



35. a) If  $x+y=12$  and  $xy=27$ , find the value of  $x^3 + y^3$   
 b) Without actually calculating the cubes, find the value of  $48^3 - 30^3 - 18^3$ .

**SECTION-E  
CASE STUDY**

36. Aditya is a Class IX student residing in a village. One day, he went to a city Hospital along with his grandfather for general checkup. From there he visited three places – School, Library and Police Station. After returning to his village, he plotted a graph by taking Hospital as origin and marked three places on the graph as per his direction of movement and distance. The graph is shown below.



37. Ankur and Ranjan start a new business together. The amount invested by both parties is given by polynomial  $p(x) = 4x^2 + 12x + 5$ , which is the product of their individual shares.

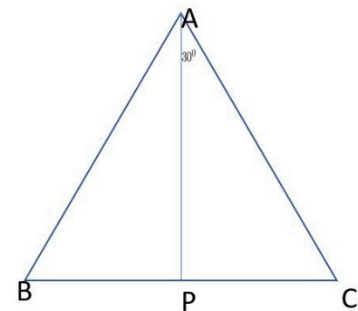
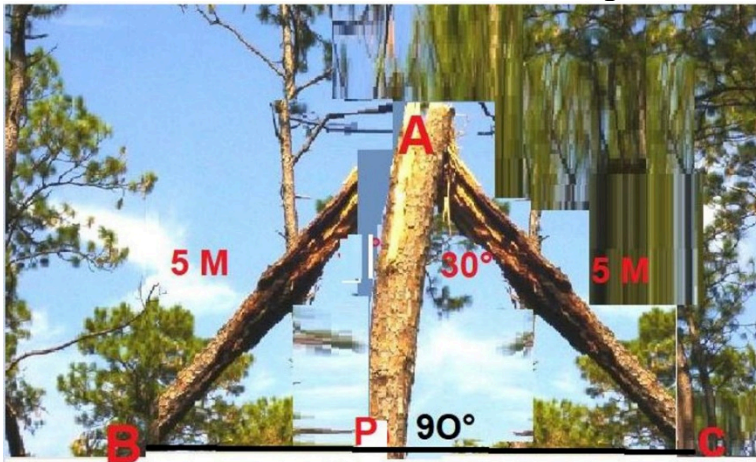
Answer the following :

- What is the name of the polynomial as per its degree?
- Find the total amount invested by both if  $x = 1000$ .
- What is the share of Ankur and Ranjan individually?

OR

How many countries are having child labor more than Mexico?

38. In a forest, a big tree got broken due to heavy rain and wind. Due to this rain the big branches AB and AC with lengths 5m fell down on the ground. Branch AC makes an angle of  $30^\circ$  with the main tree AP. The distance of Point B from P is 4 m. You can observe that  $\triangle ABP$  is congruent to  $\triangle ACP$ .



- Show that  $\triangle ACP$  and  $\triangle ABP$  are congruent.
- Find the value of  $\angle ACP$ ?
- Find the value of  $\angle BAP$ ?

OR

What is the total height of the tree?