

**KENDRIYA VIDYALAYA GACHIBOWLI, GPRA CAMPUS, HYD-32**  
**SAMPLE PAPER TEST 03 FOR ANNUAL EXAM 2023**

**SUBJECT: MATHEMATICS**  
**CLASS : IX**

**MAX. MARKS : 80**  
**DURATION : 3 HRS**

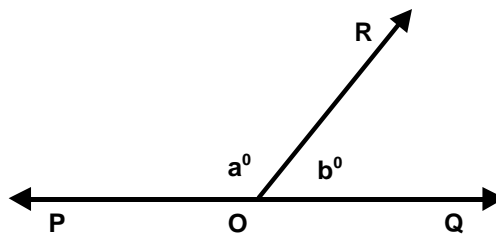
**General Instruction:**

1. This Question Paper has 5 Sections 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 sub-parts 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**

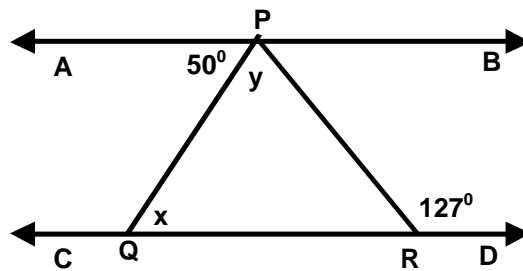
**Questions 1 to 20 carry 1 mark each.**

1. The value of  $(\sqrt{5} + \sqrt{2})^2$  is:  
(a)  $7 + 2\sqrt{5}$       (b)  $1 + 5\sqrt{2}$       (c)  $7 + 2\sqrt{10}$       (d)  $7 - 2\sqrt{10}$
2. The value of  $9^{\frac{3}{2}}$  is :  
(a) 18      (b) 27      (c) - 18      (d)  $\frac{1}{27}$
3. If  $\left(\frac{3}{4}\right)^6 \times \left(\frac{16}{9}\right)^5 = \left(\frac{4}{3}\right)^{x+2}$ , then the value of x is  
(a) 2      (b) 4      (c) -2      (d) 6
4. The value of  $p(x) = 5x - 4x^2 + 3$  for  $x = -1$  is:  
(a) 6      (b) -6      (c) 3      (d) -3
5. In fig.  $\angle POR$  and  $\angle QOR$  form a linear pair if  $a - b = 80^\circ$  then values of a and b respectively are:

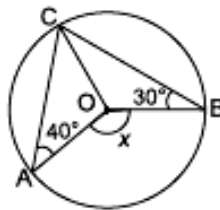


- (a)  $130^\circ$  and  $50^\circ$       (b)  $50^\circ$  and  $130^\circ$       (c)  $60^\circ$  and  $120^\circ$       (d)  $40^\circ$  and  $140^\circ$
6. On dividing  $x^3 + 3x^2 + 3x + 1$  by  $5 + 2x$  we get remainder:  
(a)  $\frac{8}{27}$       (b)  $\frac{27}{8}$       (c)  $-\frac{27}{8}$       (d)  $-\frac{8}{27}$
7. How many linear equations in x and y can be satisfied by  $x = 1$  and  $y = 2$ ?  
(a) only one      (b) two      (c) infinitely many      (d) three
8.  $x = 5, y = 2$  is a solution of the linear equation  
(a)  $x + 2y = 7$       (b)  $5x + 2y = 7$       (c)  $x + y = 7$       (d)  $5x + y = 7$

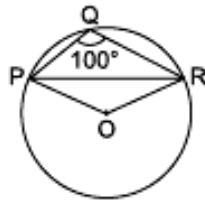
9. The graph of the linear equation  $2x + 3y = 6$  is a line which meets the x axis at the point  
 (a) (2, 0)      (b) (0, 3)      (c) (3, 0)      (d) (0, 2)
10. In fig.,  $AB \parallel CD$ ,  $\angle APQ = 50^\circ$ ,  $\angle PRD = 127^\circ$ , then the value of x and y respectively are  
 (a)  $50^\circ$  and  $77^\circ$       (b)  $40^\circ$  and  $85^\circ$       (c)  $60^\circ$  and  $90^\circ$       (d)  $85^\circ$  and  $75^\circ$



11. An angle is  $20^\circ$  more than three times the given angle. If the two angles are supplementary the angles are  
 (a)  $20^\circ$  and  $160^\circ$       (b)  $40^\circ$  and  $140^\circ$       (c)  $60^\circ$  and  $120^\circ$       (d)  $70^\circ$  and  $110^\circ$
12. In the given figure, O is the centre of the circle. The value of x is  
 (a)  $140^\circ$       (b)  $70^\circ$       (c)  $290^\circ$       (d)  $210^\circ$



13. In the given figure, the value of  $\angle OPR$  is  
 (a)  $65^\circ$       (b)  $10^\circ$       (c)  $20^\circ$       (d)  $50^\circ$



14.  $\triangle ABC$  is right triangle in which  $\angle A = 90^\circ$  and  $AB = AC$ . The values of  $\angle B$  and  $\angle C$  will be  
 (a)  $\angle B = \angle C = 60^\circ$       (b)  $\angle B = \angle C = 30^\circ$   
 (c)  $\angle B = \angle C = 45^\circ$       (d)  $\angle B = \angle C = 50^\circ$

15. Three angles of a quadrilateral are  $75^\circ$ ,  $90^\circ$  and  $75^\circ$ . The fourth angle is  
 (a)  $90^\circ$       (b)  $95^\circ$       (c)  $105^\circ$       (d)  $120^\circ$

16. If the area of an equilateral triangle is  $16\sqrt{3} \text{ cm}^2$ , then the perimeter of the triangle is:  
 (a) 64 cm      (b) 60 cm      (c) 36 cm      (d) none of these

17. The area of the triangle whose sides are 42 cm, 34 cm and 20 cm in length is  
 (a)  $150 \text{ cm}^2$       (b)  $336 \text{ cm}^2$       (c)  $300 \text{ cm}^2$       (d) none of these

18. In a frequency distribution, the mid-value of a class is 10 and width of each class is 6. The lower limit of the class is  
 (a) 6      (b) 7      (c) 8      (d) 12

**DIRECTION:** In the question number 19 and 20, a statement of **Assertion (A)** is followed by a statement of **Reason (R)**.  
 Choose the correct option

19. **Assertion (A):** Supplement of angle is one fourth of itself. The measure of the angle is  $144^\circ$ .  
**Reason (R):** Two angles are said to be supplementary if their sum of measure of angles is  $180^\circ$ .

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

**20. Assertion (A):** In  $\triangle ABC$ ,  $AB = AC$  and  $\angle B = 50^\circ$ , then  $\angle C$  is  $50^\circ$ .

**Reason (R):** Angles opposite to equal sides of a triangle are equal.

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

### SECTION – B

**Questions 21 to 25 carry 2 marks each.**

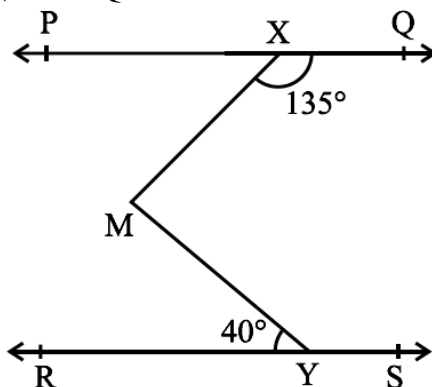
**21. Simplify:**  $(256)^{\left(-4\frac{-3}{2}\right)}$

**OR**

Show that  $1.\overline{235}$  can be expressed in the form of  $\frac{p}{q}$ , where p and q are integers and  $q \neq 0$ .

**22. Expand:**  $(4a - b + 2c)^2$

**23. In the below figure, if  $PQ \parallel RS$ ,  $\angle MXQ = 135^\circ$  and  $\angle MYR = 40^\circ$ , find  $\angle XMY$ .**



**24. In  $\triangle ABC$ , the bisector AD of  $\angle A$  is perpendicular to side BC. Show that  $AB = AC$  and  $\triangle ABC$  is isosceles.**

**25. A right triangle ABC with sides 5 cm, 12 cm and 13 cm is revolved about the side 12 cm. Find the volume of the solid so obtained.**

**OR**

A hemispherical bowl has a radius of 3.5 cm. What would be the volume of water it would contain?

### SECTION – C

**Questions 26 to 31 carry 3 marks each.**

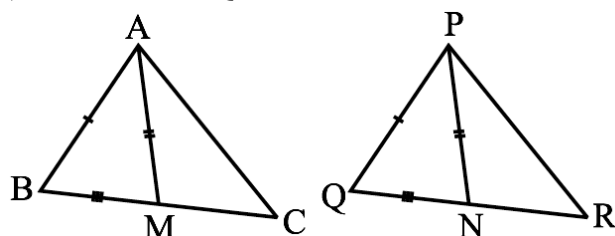
**26. Factorise:** (i)  $6x^2 + 7x - 3$  (ii)  $2x^2 - 7x - 15$

**OR**

Factorise: (i)  $27y^3 + 125z^3$  (ii)  $64m^3 - 343n^3$

**27. If  $a + b + c = 9$  and  $ab + bc + ca = 26$ , find  $a^2 + b^2 + c^2$ .**

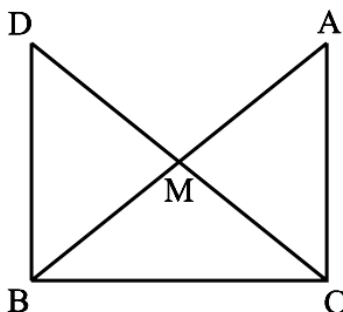
28. Write the statement of Euclid's fifth postulate. How would you rewrite Euclid's fifth postulate so that it would be easier to understand?
29. Find the value of  $k$ , if  $x = 3$ ,  $y = 2$  is a solution of the equation  $2x + 3y = k$ .  
Find the points where the graph of the above equation cuts the  $x$ -axis and the  $y$ -axis.
30. If two intersecting chords of a circle make equal angles with the diameter passing through their point of intersection, prove that the chords are equal.
31. Two sides  $AB$  and  $BC$  and median  $AM$  of one triangle  $ABC$  are respectively equal to sides  $PQ$  and  $QR$  and median  $PN$  of  $\triangle PQR$  (see below figure). Show that:  
(i)  $\triangle ABM \cong \triangle PQN$  (ii)  $\triangle ABC \cong \triangle PQR$



OR

In right triangle  $ABC$ , right angled at  $C$ ,  $M$  is the mid-point of hypotenuse  $AB$ .  $C$  is joined to  $M$  and produced to a point  $D$  such that  $DM = CM$ . Point  $D$  is joined to point  $B$  (see below figure). Show that:

- (i)  $\triangle AMC \cong \triangle BMD$   
(ii)  $\angle DBC$  is a right angle.  
(iii)  $\triangle DBC \cong \triangle ACB$

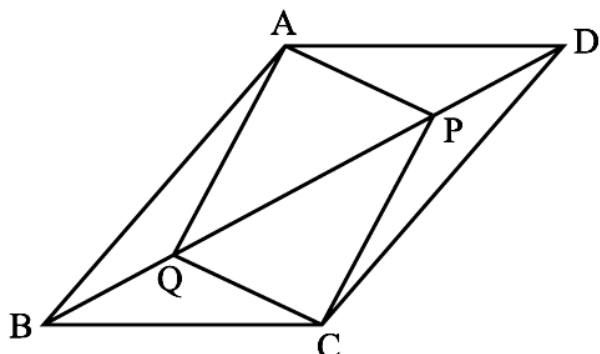


### SECTION – D

Questions 32 to 35 carry 5 marks each.

32. Evaluate:  $\frac{1}{\sqrt{2}+1} + \frac{1}{\sqrt{3}+\sqrt{2}} + \frac{1}{\sqrt{4}+\sqrt{3}} + \dots + \frac{1}{\sqrt{9}+\sqrt{8}}$

33. In parallelogram  $ABCD$ , two points  $P$  and  $Q$  are taken on diagonal  $BD$  such that  $DP = BQ$  (see below figure). Show that:



- (i)  $\triangle APD \cong \triangle CQB$  (ii)  $AP = CQ$  (iii)  $\triangle AQB \cong \triangle CPD$   
(iv)  $AQ = CP$  (v)  $APCQ$  is a parallelogram

OR

ABCD is a rhombus and P, Q, R and S are the mid-points of the sides AB, BC, CD and DA respectively. Show that the quadrilateral PQRS is a rectangle.

34. Draw histogram and frequency polygon for the following distribution:

C. I.	0 – 50	50 – 100	100 – 150	150 – 200	200 – 250	250 – 300
F	4	8	16	13	6	3

35. At a Ramzan Mela, a stall keeper in one of the food stalls has a large cylindrical vessel of base radius 15 cm filled up to a height of 32 cm with orange juice. The juice is filled in small cylindrical glasses (see below figure) of radius 3 cm up to a height of 8 cm, and sold for Rs 3 each. How much money does the stall keeper receive by selling the juice completely?

OR

Monica has a piece of canvas whose area is 551 m<sup>2</sup>. She uses it to have a conical tent made, with a base radius of 7 m. Assuming that all the stitching margins and the wastage incurred while cutting, amounts to approximately 1 m<sup>2</sup>, find the volume of the tent that can be made with it.

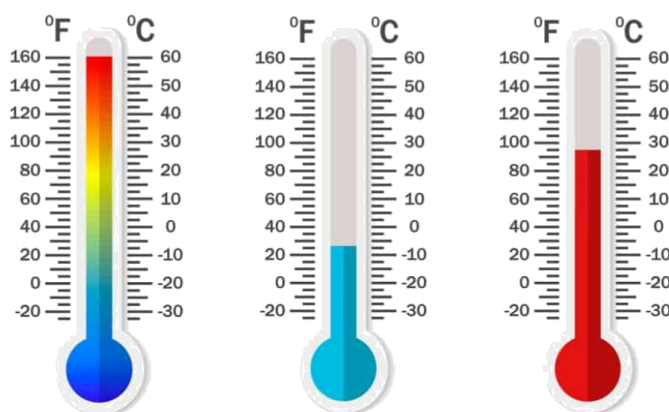
### SECTION – E(Case Study Based Questions)

Questions 36 to 38 carry 4 marks each.

36. Case Study – 1

Temperature can be measured in both Fahrenheit and Celsius scale. Both are the standard units for measuring temperature. There is a conversion formula by which Fahrenheit temperature can be converted into Celsius temperature. This formula is in the form of a linear equation:

$$F = \left(\frac{9}{2}\right)C + 32, \text{ where, F and C are the temperatures in Fahrenheit and Celsius.}$$



(i) If Celsius scale is taken on x-axis, then what is the point on X-axis, where this linear equation cuts the X-axis. [1]

(ii) At what point does this linear equation, cut the Y-axis ? [1]

(iii) If the temperature is 30°C, then what is the temperature in Fahrenheit? [2]

OR

(iii) If the temperature is 95°F, what is the temperature in Celsius? [2]

37. Case Study – 2

Triangles are used in bridges because they evenly distribute weight without changing their proportions. When force is applied on a shape like a rectangle it would flatten out. Before triangles were used in bridges, they were weak and could not be very big. To solve that problem engineers would put a post in the middle of a square and make it more sturdy. Isosceles triangles were used to construct a bridge in which the base (unequal side) of an isosceles triangle is 4 m and its perimeter is 20 m.



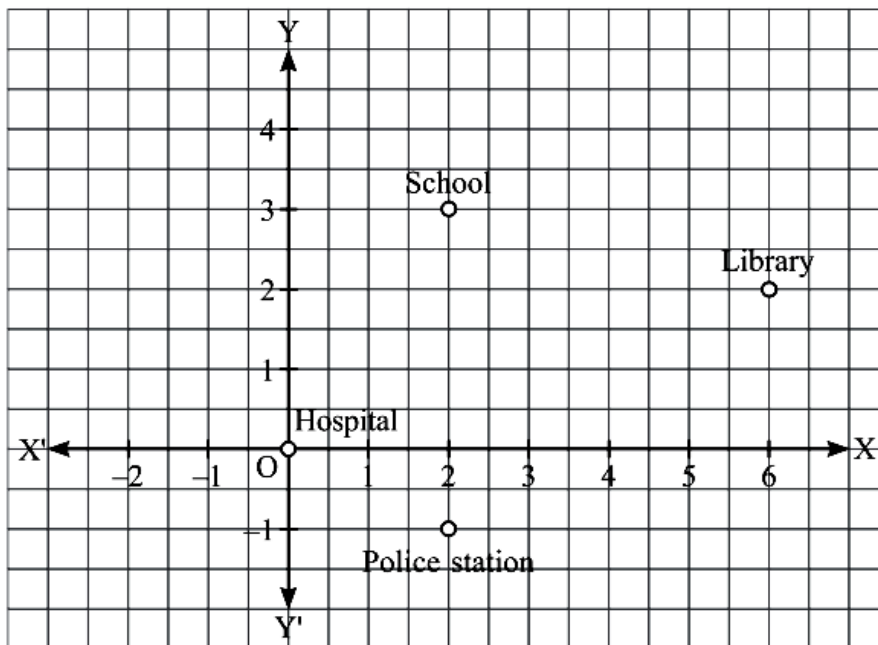
- (i) What is the length of equal sides? [1]
- (ii) In a  $\Delta ABC$  it is given that base = 12 m and height = 5 m. Find its area. [1]
- (iii) What is the area of the given isosceles triangle? [2]

**OR**

- (iii) Find the cost of covering the sheet for one isosceles triangle at the rate of Rs 200 per metre. [2]

### 38. Case Study – 3

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:



**Answer the following questions:**

- (i) What are the coordinates of Library? [1]
- (ii) In which quadrant the point (-1, 4) lies? [1]
- (iii) What are the coordinates of School and Police Station? Find the distance between school and police station. [2]

**OR**

- (iii) Find the distance between Hospital and Library. [2]