

CBSE Board
Class IX Mathematics
Sample Paper 3

Time: 3 hrs

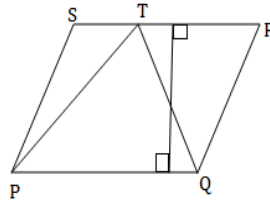
Total Marks: 80

General Instructions:

1. All questions are **compulsory**.
2. The question paper consists of **30** questions divided into **four sections** A, B, C, and D. **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.
3. Use of calculator is **not** permitted.

Section A
(Questions 1 to 6 carry 1 mark each)

1. If $(\sqrt{5} + \sqrt{6})^2 = a + b\sqrt{30}$ then find the values of a and b.
2. $p(x) = cx + d$ is a zero polynomial. What is the value of x?
3. In the given figure, PQRS is a parallelogram having base PQ = 6 cm and perpendicular height is also 6 cm, Find the area of ΔPTQ ?



OR

ABCD is a parallelogram having an area of 60 cm^2 . P is a point on CD. Calculate the area of ΔAPB .

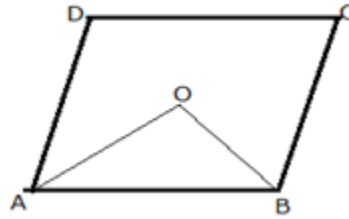
4. Check whether $(\frac{1}{2}, 0)$ is the solution of the equation $2x + y = 1$?

OR

If $(4, 19)$ is a solution of the equation $y = ax + 3$ then find the value of a.

5. Define Median of a triangle.

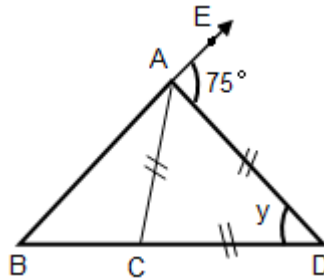
6. ABCD is a parallelogram. If OA and OB are the angle bisectors of the consecutive angles, then $m\angle AOB = ?$



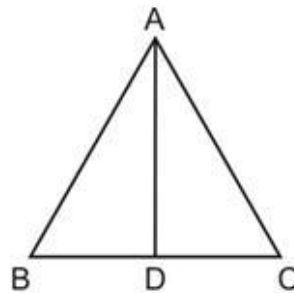
Section B

(Questions 7 to 12 carry 2 marks each)

7. Express $\overline{0.975}$ in the form $\frac{p}{q}$, where p and q are integers and $q \neq 0$.
8. Factorise: $x^2 + \frac{1}{x^2} + 2 - 2x - \frac{2}{x}$
9. In the figure below, $BC = AC = AD$ and $\angle DAE = 75^\circ$. Find the value of y .

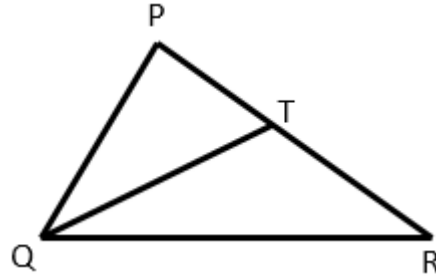


10. In the figure, AD is the bisector of $\angle A$; prove that $AB > BD$.



OR

In ΔPQR , $PR > PQ$ and T is a point on PR such that $PT = PQ$. Prove that $QR > TR$.



11. The total surface area of a cube is 294 cm^2 . Find its volume.

OR

Find the volume of a cube whose diagonal is $\sqrt{48}$ cm.

12. Check which of the following are solutions of the equation $7x - 5y = -3$.
- $(-1, -2)$
 - $(-4, -5)$

Section C

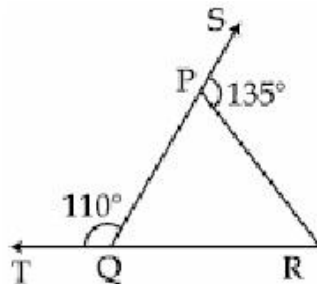
(Questions 13 to 22 carry 3 marks each)

13. Evaluate: $\sqrt[3]{(343)^{-2}}$

OR

Evaluate $\sqrt{\frac{1}{4}} + 0.01^{-\frac{1}{2}} - 27^{\frac{2}{3}}$

14. What is the zero of the polynomial $p(x) = (a^2 + b^2)x + (a - b)^2 + (a + b)^2$?
15. Use a suitable identity to factorise $27p^3 + 8q^3 + 54p^2q + 36p^2q^2$.
16. In the figure, sides QP and RQ of $\triangle PQR$ are produced to points S and T respectively. If $\angle SPR = 135^\circ$ and $\angle PQT = 110^\circ$, then find $\angle PRQ$.



17. Prove that in an isosceles triangle the angles opposite to the equal sides are equal.

OR

Prove that the medians corresponding to equal sides of an isosceles triangle are equal.

18. Fifty seeds each were selected at random from 5 bags of seeds, and were kept under standardized conditions favorable to germination. After 20 days, the number of seeds which had germinated in each collection were counted and recorded as follows:

Bags	1	2	3	4	5
Number of germinated seeds	40	48	42	39	41

What is the probability of

- More than 40 seeds germinating in a bag?
- 49 seeds germinating in a bag?
- More than 35 seeds germinating in a bag?

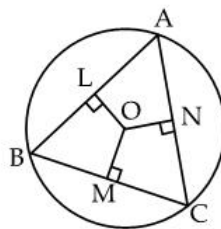
OR

A survey was undertaken in 30 classes at a school to find the total number of fail students in each class. The table below shows the results:

No. of fail students	0	1	2	3	4	5
Frequency (no. of classes)	1	2	5	12	8	2

A class was selected at random.

- Find the probability that the class has 2 fail students.
 - What is the probability that the class has at least 3 fail students?
 - Given that the total number of students in the 30 classes is 960, find the probability that a student randomly chosen from these 30 classes is fail.
19. In the figure, O is the centre of the circle, $OM \perp BC$, $OL \perp AB$, $ON \perp AC$ and $OM = ON = OL$.



Is ΔABC equilateral? Give reasons.

20. Show that if the diagonals of a quadrilateral are equal and bisect each other at right angles, then it is a square.
21. The relative humidity (in %) of a certain city for a month of 30 days was as follows:

98.1	98.6	99.2	90.3	86.5	95.3	92.9	96.3	94.2	95.1
97.3	89.2	92.3	97.1	93.5	92.7	95.1	97.2	93.3	95.2
89	96.2	92.1	84.9	90.2	95.7	98.3	97.3	96.1	92.1

- i. Construct a grouped frequency distribution table with classes 84 - 86, 86 - 88
- ii. Which month or season do you think this data is about?
- iii. What is the range of this data?

22. A hemispherical bowl, made of steel, is 0.25 cm thick. The inner radius of the bowl is 5 cm. Find the outer curved surface area of the bowl.

OR

50 cylindrical pillars of a hall are to be painted. The diameter of each pillar is 5 m and the height is 21 m, what will be the cost of painting them at the rate of Rs 4.50 per m²?

Section D

(Questions 23 to 30 carry 4 marks each)

23. Find the value of $\frac{1}{3-\sqrt{8}} - \frac{1}{\sqrt{8}-\sqrt{7}} + \frac{1}{\sqrt{7}-\sqrt{6}} - \frac{1}{\sqrt{6}-\sqrt{5}} + \frac{1}{\sqrt{5}-2}$

24. How does Euclid's fifth postulate imply the existence of parallel lines? Give a mathematical proof.

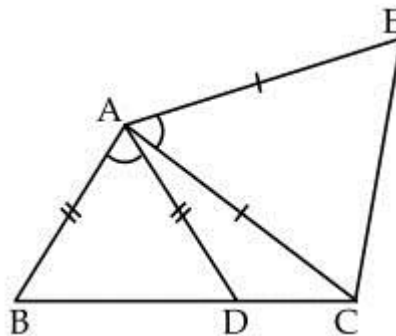
25. Find $x^3 + y^3$ when $x = \frac{1}{3-2\sqrt{2}}$ and $y = \frac{1}{3+2\sqrt{2}}$.

OR

If $p + q = 8$ and $p - q = 4$, find:

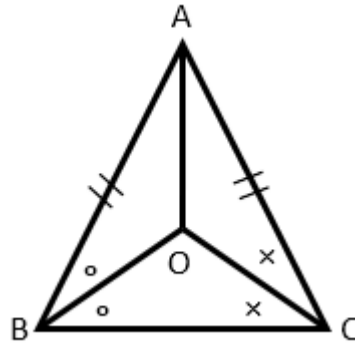
(i) pq , (ii) $p^2 + q^2$

26. In the given figure, $AC = AE$, $AB = AD$ and $\angle BAD = \angle EAC$. Prove that $BC = DE$.



OR

In $\triangle ABC$, $AB = AC$ and the bisectors of angles B and C intersect at point O. Prove that $BO = CO$ and the ray AO is the bisector of angle BAC.

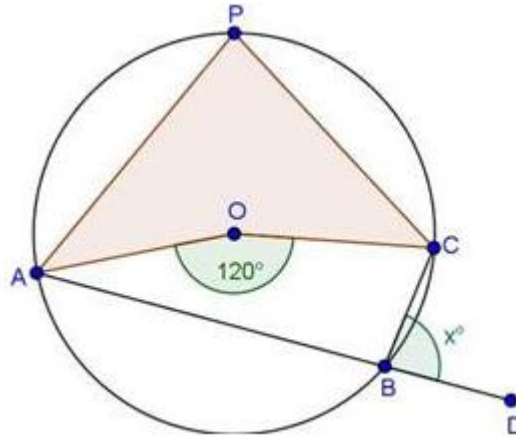


27. A garden is in the shape of quadrilateral. The sides of the garden are 9 m, 40 m, 28 m and 15 m, respectively, in consecutive order, and the angle between the first two sides is a right angle. Find the area of the garden.

OR

A horse is tied with a 21 m long rope to the corner of a field which is in the shape of an equilateral triangle. Find the area of the field over which it can graze.

28. If O is the centre of the circle, find the value of x in the following figure.



29. Construct a triangle having a perimeter of 12.5 cm and angles in the ratio of 3: 4: 5.
30. Draw the graph of the linear equation $x + 2y = 8$. From the graph, check whether $(-1, -2)$ is a solution of this equation.