CBSE Class 9 Maths Sample Paper

SUBJECT: MATHEMATICS **MAX. MARKS : 80**

CLASS : IX **DURATION : 3 HRS**

General Instruction:

(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) There is no overall choice. However, an internal choice has been provided in two questions in 1 mark each, two questions in 2 marks each, four questions of 3 marks each and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.

(v) Use of Calculators is not permitted

SECTION – A

Questions 1 to 6 carry 1 mark each.

1. The height of an equilateral triangle measures $9\sqrt{3}$ cm. Find its area.

2. What is the total surface area of a hemisphere of base radius 7cm?

OR

The surface area of two hemispheres are in the ratio 25 : 49. Find the ratio of their radii.

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

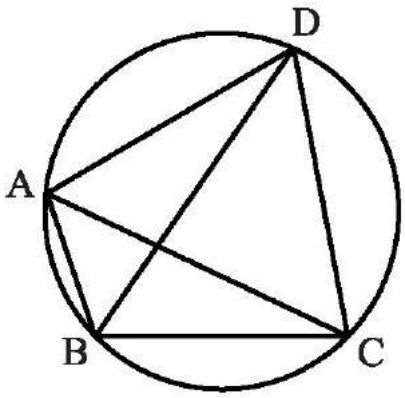
OR

At what point the graph of the linear equation x + y = 5 cuts the x-axis?

4. Without actually calculating, find the value of $(25)^3 - (75)^3 + (50)^3$.

5. The record of a weather station shows that out of the past 250 consecutive days, its weather forecasts were correct 175 times. What is the probability that it was not correct on a given day?

6. In the Fig, ABCD is a cyclic quadrilateral in which AC and BD are its diagonals. If $\angle DBC = 60°$ and $\angle BAC = 30°$, find $\angle BCD$.



SECTION – B

Questions 6 to 12 carry 2 marks each.

7. A right triangle with sides 6 cm, 8 cm and 10 cm is revolved about the side 8 cm. Find the volume of the solid so formed.

8. Factorise: $27x^3 - \frac{1}{216} - \frac{9}{2}x^2 + \frac{1}{4}x$

OR

Find the value of k, if x + k is the factor of the polynomials:

(i) $x^3 + kx^2 - 2x + k + 5$

(ii) $x^4 - k^2x^2 + 3x - 6k$

9. The following number of goals were scored by a team in a series of 10 matches:
2, 3, 4, 5, 0, 1, 3, 3, 4, 3
Find the mean, median and mode of these scores.

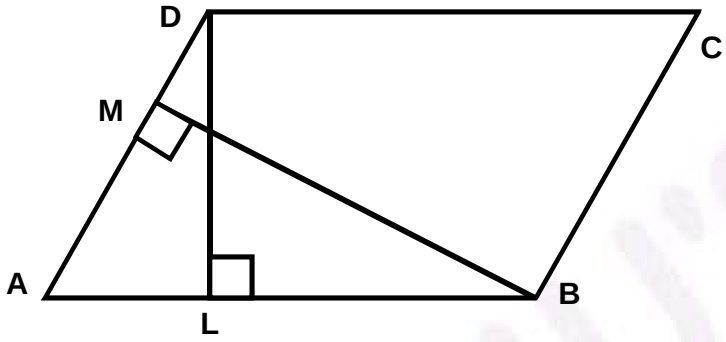
10. The angle between two altitudes of a parallelogram through the vertex of an obtuse angle of the parallelogram is 60^0. Find the angles of the parallelogram.

11. An isosceles triangle has perimeter 30 cm and each of the equal sides is 12 cm. Find the area of the triangle.

OR

Using Heron's formula, find the area of an equilateral triangle whose perimeter is 162 cm. (Use $\sqrt{3} = 1.73$)

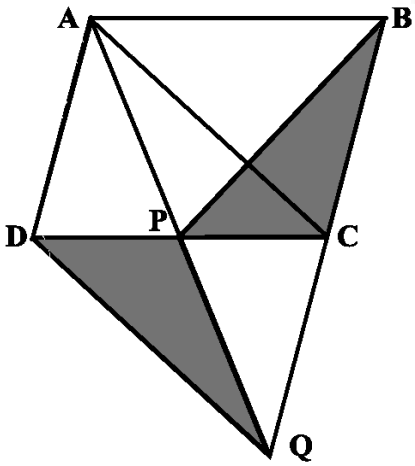
12. In the below figure, ABCD is a parallelogram; AB = 10 cm; BM = 8 cm and DL = 6 cm, then find AD.

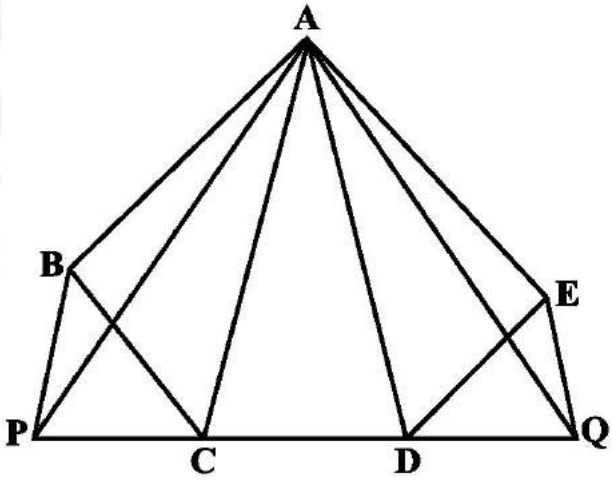


SECTION – C

Questions 13 to 22 carry 3 marks each.

13. In the below fig. ABCD is a parallelogram and BC is produced to a point Q such that AD = CQ. If AQ intersects DC at P, show that ar(ΔBPC) = ar(ΔDPQ)





In the below figure, ABCDE is any pentagon. BP drawn parallel to AC meets DC produced at P and EQ drawn parallel to AD meets CD produced at Q. Prove that ar (ABCDE) = ar (APQ)

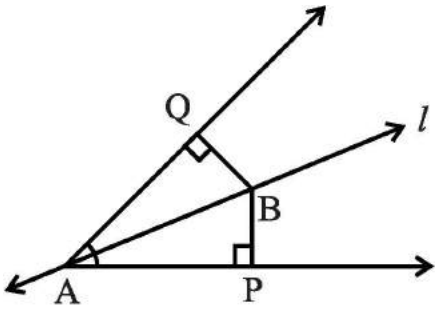
14. 1500 families with 2 children were selected randomly, and the following data were recorded:

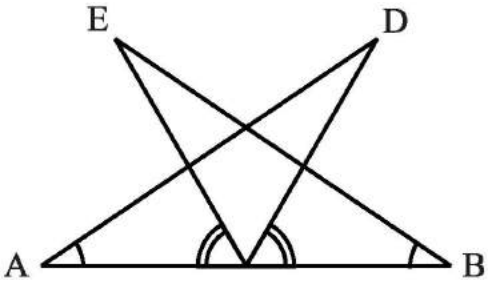
Number of girls in a family	0	1	2
Number of families	475	814	211

Compute the probability of a family, chosen at random, having
(i) 2 girls (ii) 1 girl (iii) No girl

15. 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) Δ APB $\cong$ ΔAQB (ii) BP = BQ or B is equidistant from the arms of $\angle A$.

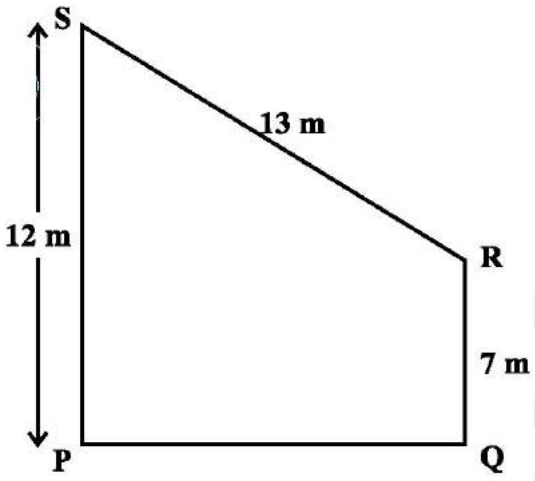


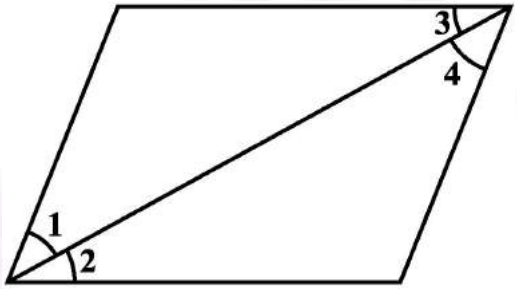


OR

AB is a line segment and P is its mid-point. D and E are points on the same side of AB such that $\angle$BAD = $\angle$ABE and $\angle$EPA = $\angle$DPB (see the above right sided figure). Show that (i) ΔDAP $\cong$ ΔEBP (ii) AD = BE

16. Find the area of the trapezium PQRS with height PQ given in the below left Figure.





17. In the above right sided figure., if $\angle 1 = \angle 3$, $\angle 2 = \angle 4$ and $\angle 3 = \angle 4$, write the relation between $\angle 1$ and $\angle 2$, using an Euclid's axiom.

18. Verify: (i) $x^3 + y^3 = (x + y)(x^2 - xy + y^2)$ (ii) $x^3 - y^3 = (x - y)(x^2 + xy + y^2)$

19. Give the geometric representations of 2x + 9 = 0 as an equation (i) in one variable (ii) in two variables.

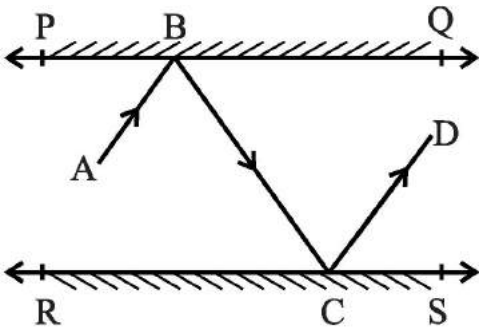
20. Find the value of a and b in $\frac{2+\sqrt{3}}{2-\sqrt{3}} = a + b\sqrt{3}$

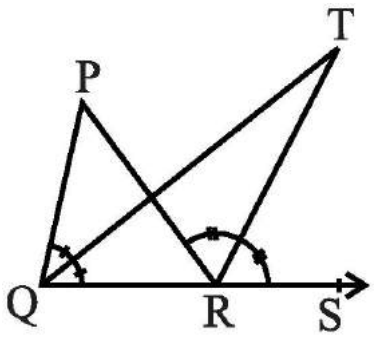
OR

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

21. Two chords AB and CD of lengths 5 cm and 11 cm respectively of a circle are parallel to each other and are on opposite sides of its centre. If the distance between AB and CD is 6 cm, find the radius of the circle.

22. In the adjoining figure, PQ and RS are two mirrors placed parallel to each other. An incident ray AB strikes the mirror PQ at B, the reflected ray moves along the path BC and strikes the mirror RS at C and again reflects back along CD. Prove that AB || CD.





OR

In the above right sided figure, the side QR of PQR is produced to a point S. If the bisectors of $\angle$PQR and $\angle$PRS meet at point T, then prove that $\angle QTR = \frac{1}{2}\angle QPR$.

SECTION – D

Questions 23 to 30 carry 4 marks each.

23. A cloth having an area of 165 m^2 is shaped into the form of a conical tent of radius 5 m.

(i) How many students can sit in the tent if a student, on an average, occupies $\frac{5}{7} m^2$ on the ground?

(ii) Find the volume of the cone.

OR

Shanti Sweets Stall was placing an order for making cardboard boxes for packing their sweets. Two sizes of boxes were required. The bigger of dimensions 25 cm × 20 cm × 5 cm and the smaller of dimensions 15 cm × 12 cm × 5 cm. For all the overlaps, 5% of the total surface area is required extra. If the cost of the cardboard is Rs 4 for 1000 cm2, find the cost of cardboard required for supplying 250 boxes of each kind.

24. Construct a triangle ABC, in which $\angle B = 60°$, $\angle C = 45°$ and AB + BC + CA = 11 cm.

25. A triangular park has (5, 4), (0, 0) and (5, 0) vertices,

(i) Find the area of this park by plotting them on the graph.

(ii) If 10 plants can be planted in one square unit area. Then, how many plants can be planted in the park. How is this beneficial to the society?

(iii) Write the coordinates of the point whose sign cannot be changed? What values in our life this point indicates?

26. The length of 40 leaves of a plant are measured correct to one millimetre, and the obtained data is represented in the following table:

Length (in mm)	118 – 126	127 – 135	136 – 144	145 – 153	154 – 162	163 – 171	172 – 180
Number of leaves	3	5	9	12	5	4	2

(i) Draw a histogram to represent the given data.

(ii) Is there any other suitable graphical representation for the same data?

(iii) Is it correct to conclude that the maximum number of leaves are 153 mm long? Why?

27. Represent the real number $\sqrt{2}, \sqrt{3}, \sqrt{5}$ on a single number line.

28. P, Q, R and S are respectively the mid-points of the sides AB, BC, CD and DA of a quadrilateral ABCD such that AC $\perp$ BD. Prove that PQRS is a rectangle.

29. Draw the graph of the linear equation $2x + 3y = 12$. At what points, the graph of the equation cuts the x-axis and the y-axis?

30. Find the values of a and b so that the polynomial $x^3 - 10x^2 + ax + b$ is exactly divisible by $(x - 1)$ as well as $(x - 2)$.

OR

Without actual division, prove that $2x^4 - 5x^3 + 2x^2 - x + 2$ is divisible by $x^2 - 3x + 2$.