

**KENDRIYA VIDYALAYA SANGATHAN, HYDERABAD REGION**  
**SAMPLE PAPER 02 FOR SESSING ENDING EXAM (2017-18)**

SUBJECT: MATHEMATICS(041)

**BLUE PRINT : CLASS IX**

Unit	Chapter	VSA (1 mark)	SA – I (2 marks)	SA – II (3 marks)	LA (4 marks)	Total	Unit Total
Number system	Number Systems	1(1)	--	3(1)*	4(1)	8(3)	8(3)
Algebra	Polynomials	--	2(1)	3(1)	4(1)*	9(3)	17(6)
	Linear Equations in two variables	1(1)	--	3(1)	4(1)	8(3)	
Coordinate Geometry	Coordinate Geometry	--	--	--	4(1)	4(1)	4(1)
Geometry	Introduction to Euclid's Geometry	--	--	3(1)	--	3(1)	28(10)
	Lines and Angles	--	--	3(1)*	--	3(1)	
	Triangles	--	--	3(1)*	--	3(1)	
	Quadrilaterals	--	2(1)	--	4(1)*	6(2)	
	Area of Parallelograms and triangles	--	2(1)	3(1)*	--	5(2)	
	Circles	1(1)	--	3(1)	--	4(2)	
	Constructions	--	--	--	4(1)	4(1)	
Mensuration	Heron's Formula	1(1)	2(1)	3(1)	--	6(3)	13(6)
	Surface Areas and Volumes	1(1)	2(1)	--	4(1)*	7(3)	
Statistics and Probability	Statistics	--	2(1)	--	4(1)	6(2)	10(4)
	Probability	1(1)	--	3(1)	--	4(2)	
<b>Total</b>		<b>6(6)</b>	<b>12(6)</b>	<b>30(10)</b>	<b>32(8)</b>	<b>80(30)</b>	<b>80(30)</b>

**Note: \* - Internal Choice Questions**

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**CLASS : IX**

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

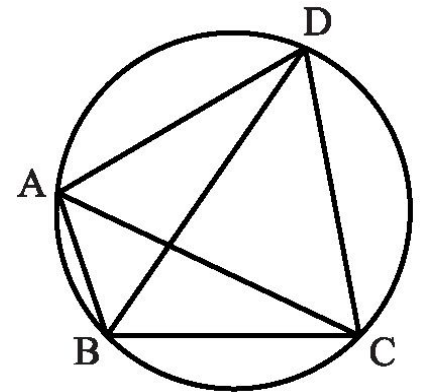
**General Instruction:**

- (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 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. What is the total surface area of a hemisphere of base radius 7cm?
2. Find the value of k, if  $x = 2$ ,  $y = 1$  is a solution of the equation  $2x + 3y = k$ .
3. The height of an equilateral triangle measures  $9\sqrt{3}$  cm. Find its area.
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  $\angle DBC = 60^\circ$  and  $\angle BAC = 30^\circ$ , find  $\angle BCD$ .

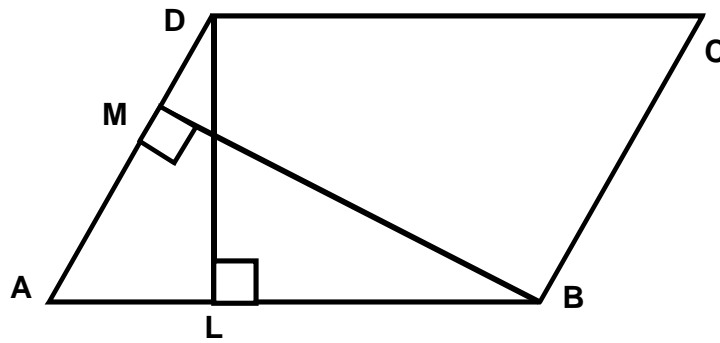


**SECTION – B**

**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:  $27x^3 - \frac{1}{216} - \frac{9}{2}x^2 + \frac{1}{4}x$
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  $60^\circ$ . Find the angles of the parallelogram.

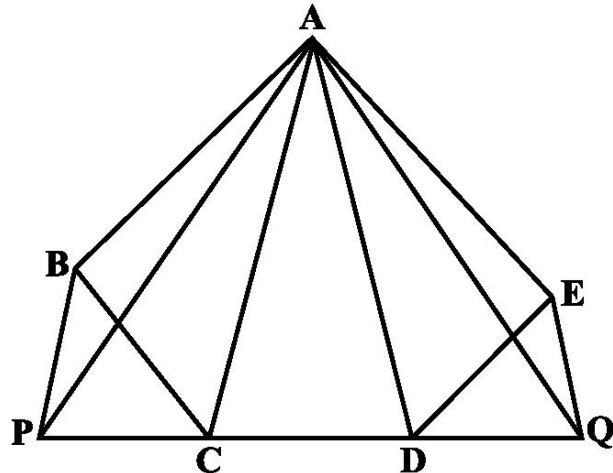
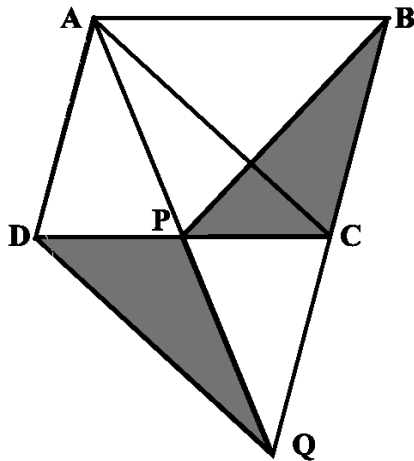
11. An isosceles triangle has perimeter 30 cm and each of the equal sides is 12 cm. Find the area of the triangle.
12. In the below figure, ABCD is a parallelogram; AB = 10 cm; BM = 8 cm and DL = 6 cm, then find AD.



### SECTION – C

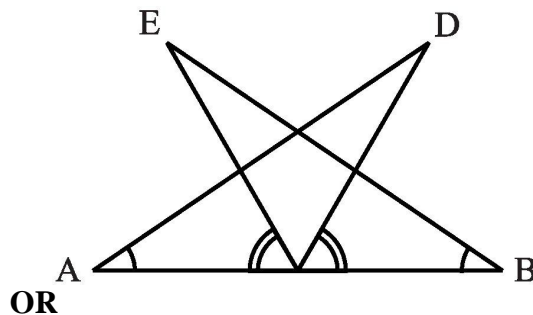
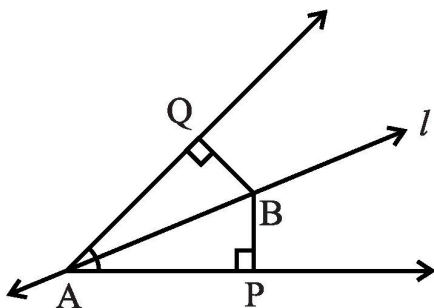
Questions 13 to 22 carry 3 marks each.

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  $\text{ar}(\triangle BPC) = \text{ar}(\triangle DPQ)$



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  $\text{ar}(\text{ABCDE}) = \text{ar}(\text{APQ})$

14. 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)  $\triangle APB \cong \triangle AQB$  (ii)  $BP = BQ$  or B is equidistant from the arms of  $\angle A$ .



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)  $\triangle DAP \cong \triangle EBP$  (ii)  $AD = BE$

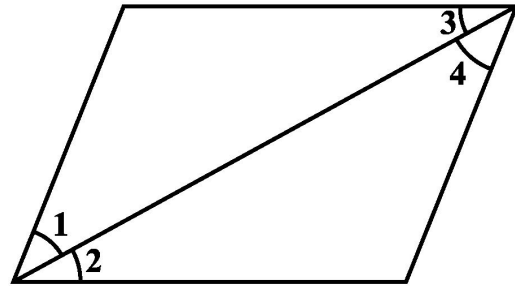
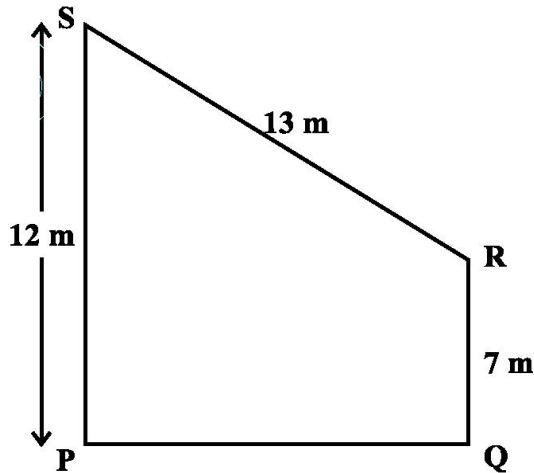
15. 1500 families with 2 children were selected randomly, and the following data were recorded:

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

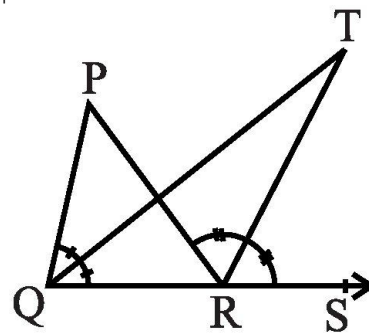
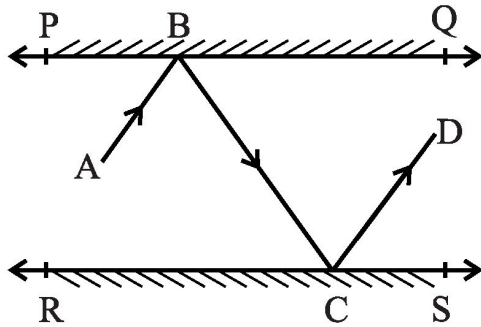
16. Find the area of the trapezium PQRS with height PQ given in the below left Figure.



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. 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  $AB \parallel CD$ .



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  $\angle QTR = \frac{1}{2} \angle QPR$ .

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

21. 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.

22. 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.

### SECTION – D

**Questions 23 to 30 carry 4 marks each.**

23. A cloth having an area of 165 m<sup>2</sup> 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<sup>2</sup> 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 cm<sup>2</sup>, find the cost of cardboard required for supplying 250 boxes of each kind.

24. Construct a triangle ABC, in which  $\angle B = 60^\circ$ ,  $\angle C = 45^\circ$  and  $AB + BC + CA = 11$  cm.
25. Represent the real number  $\sqrt{2}, \sqrt{3}, \sqrt{5}$  on a single number line.
26. 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.
27. 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?

28. 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?
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  $x^2 - 3x + 2$ .