

KENDRIYA VIDYALAYA SANGATHAN, HYDERABAD REGION
SAMPLE PAPER 02 FOR PERIODIC TEST III 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)	2(1)	3(1)*	4(1)	10(4)	10(4)
Algebra	Polynomials	1(1)	2(1)	3(1)	4(1)*	10(4)	18(7)
	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)	32(11)
	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(1)*	8(3)	
	Constructions	--	--	--	4(1)	4(1)	
Mensuration	Heron's Formula	1(1)	2(1)	3(1)	--	6(3)	16(7)
	Surface Areas and Volumes	1(1)	2(1)	3(1)	4(1)*	10(4)	
Total		6(6)	12(6)	30(10)	32(8)	80(30)	80(30)

Note: * - Internal Choice Questions

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MAX. MARKS : 80
DURATION : 3 HRS

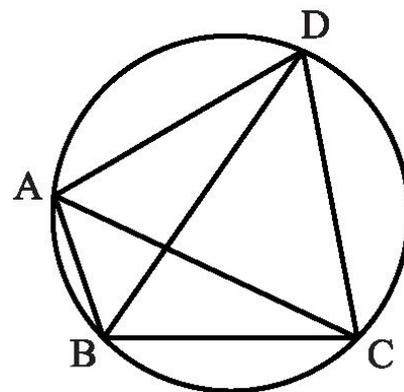
General Instruction:

- (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. Simplify: $\sqrt[8]{\frac{6561}{65536}}$
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 $\angle BCD$.

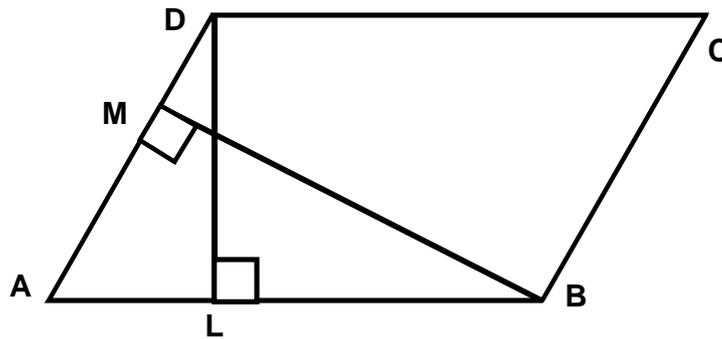


SECTION – B

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. Show that $0.2353535\dots$ can be expressed in the form of $\frac{p}{q}$, where p and q are integers and $q \neq 0$.
9. Factorise: $27x^3 - \frac{1}{216} - \frac{9}{2}x^2 + \frac{1}{4}x$
10. The angle between two altitudes of a parallelogram through the vertex of an obtuse angle of the parallelogram is 60° . Find the angles of the parallelogram.

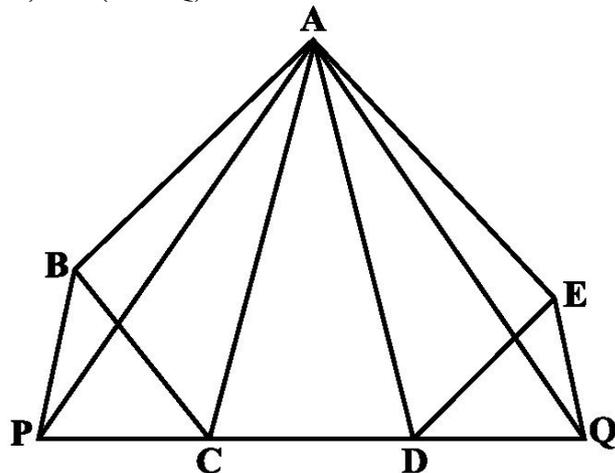
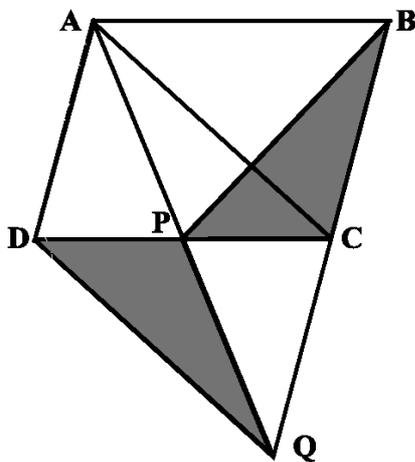
11. An isosceles triangle has perimeter 30 cm and each of the equal sides is 12 cm. Find the area of the triangle.
12. In the below figure, ABCD is a parallelogram; AB = 10 cm; BM = 8 cm and DL = 6 cm, then find AD.



SECTION – C

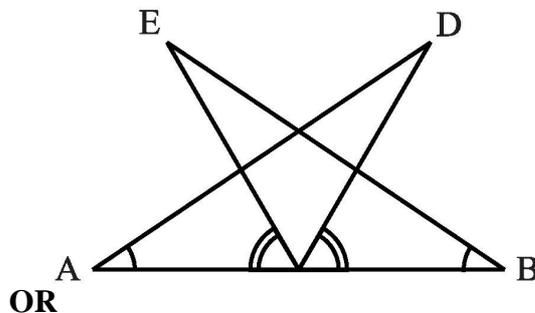
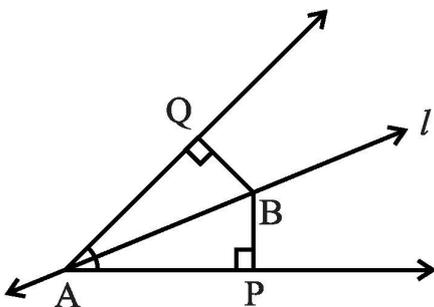
Questions 13 to 22 carry 3 marks each.

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



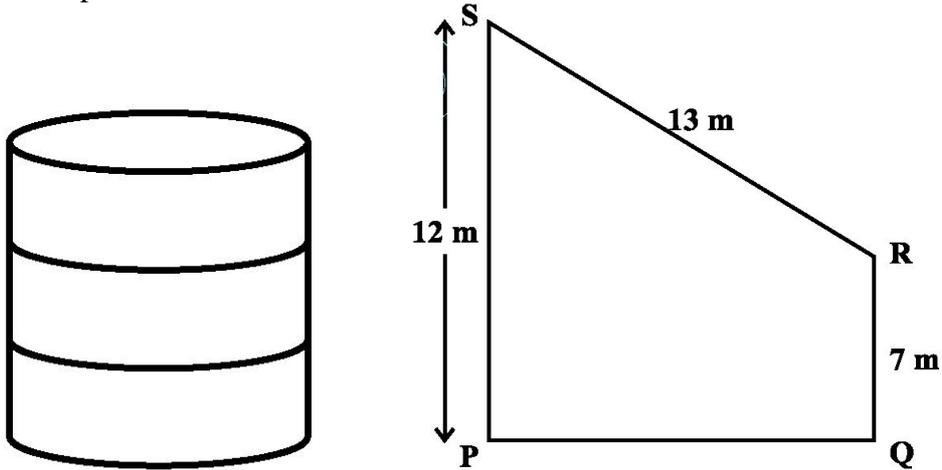
In the below figure, ABCDE is any pentagon. BP drawn parallel to AC meets DC produced at P and EQ drawn parallel to AD meets CD produced at Q. Prove that $\text{ar}(\text{ABCDE}) = \text{ar}(\text{APQ})$

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) $AD = BE$

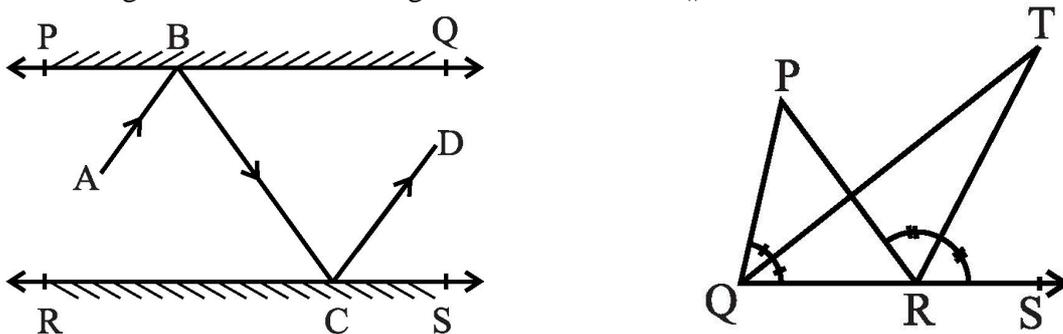
15. In the adjoining figure you see the frame of a lampshade. It is to be covered with a decorative cloth. The frame has a base diameter of 20 cm and height of 30 cm. A margin of 2.5 cm is to be given for folding it over the top and bottom of the frame. Find how much cloth is required for covering the lampshade.



16. Find the area of the trapezium PQRS with height PQ given in the above right sided Figure

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

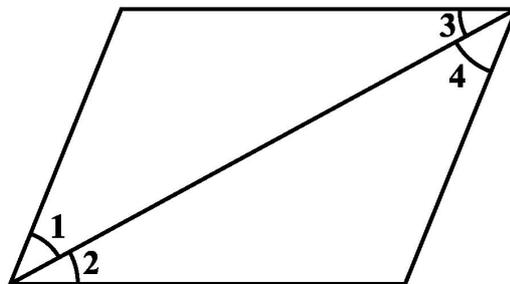
18. In the adjoining figure, PQ and RS are two mirrors placed parallel to each other. An incident ray AB strikes the mirror PQ at B, the reflected ray moves along the path BC and strikes the mirror RS at C and again reflects back along CD. Prove that $AB \parallel CD$.



OR

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

19. In the Fig., 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.



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

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. 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.

SECTION – D

Questions 23 to 30 carry 4 marks each.

23. AC and BD are chords of a circle which bisect each other. Prove that (i) AC and BD are diameters, (ii) ABCD is a rectangle.

OR

Bisectors of angles A, B and C of a triangles ABC intersect its circumcircle at D, E and F respectively. Prove that the angles of $\angle DEF$ are $90^\circ - \frac{A}{2}$, $90^\circ - \frac{B}{2}$ and $90^\circ - \frac{C}{2}$

24. A cloth having an area of 165 m² 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 $\frac{5}{7}$ m² 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.

25. Construct a triangle ABC, in which $\angle B = 60^\circ$, $\angle C = 45^\circ$ and $AB + BC + CA = 11$ cm.
26. Represent the real number $\sqrt{2}, \sqrt{3}, \sqrt{5}$ on a single number line.
27. 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.
28. Plot the following points and write the name of the figure thus obtained : P(-3, 2), Q (-7, -3), R (6, -3), S (2, 2)
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 $x^2 - 3x + 2$.