KENDRIYA VIDYALAYA SANGATHAN, HYDERABAD REGION
SAMPLE PAPER 03 FOR PERIODIC TEST III EXAM (2017-18)

SUBJECT: MATHEMATICS(041)

<u>BLUE PRINT : CLASS X</u>

Unit	Chapter	VSA (1 mark)	SA – I (2 marks)	SA – II (3 marks)	LA (4 marks)	Total	Unit Total
Number system	Real Numbers	1(1)	2(1)	3(1)	--	**6(3)**	**6(3)**
Algebra	Polynomials	--	2(1)	3(1)	--	**5(2)**	**26(10)**
	Pair of Linear Equations in two variables	--	2(1)	3(1)	4(1)*	**9(3)**	
	Quadratic Equations	1(1)	--	--	4(1)*	**5(2)**	
	Arithmetic progression	1(1)	2(1)	--	4(1)	**7(3)**	
Coordinate Geometry	Coordinate Geometry	1(1)	--	**3(1)***	4(1)	**8(3)**	**8(3)**
Trigonometry	Introduction to Trigonometry	1(1)	--	3(1) **3(1)***	4(1)	**11(4)**	**15(5)**
	Some Applications of Trigonometry	--	--	--	4(1)	**4(1)**	
Geometry	Triangles	1(1)	--	**3(1)***	4(1)*	**8(3)**	**17(6)**
	Circles	--	2(1)	3(1)	--	**5(2)**	
	Constructions	--	--	--	4(1)	**4(1)**	
Mensuration	Areas Related to Circles	--	2(1)	3(1) **3(1)***	--	**8(3)**	**8(3)**
	Total	**6(6)**	**12(6)**	**30(10)**	**32(8)**	**80(30)**	**80(30)**

Note: * - Internal Choice Questions

SUBJECT: MATHEMATICS	**MAX. MARKS : 80**
CLASS : X	**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. Which term of the AP : 21, 18, 15, . . . is – 81?

2. Check whether 6^n can end with the digit 0 for any natural number n.

3. A ladder 10 m long reaches a window 8 m above the ground. Find the distance of the foot of the ladder from base of the wall.

4. If the mid-point of the line segment joining the points P(3, b + 2) and Q(1, 4) is (2, – 3), find the value of b.

5. In Δ ABC, right-angled at B, AB = 5 cm and $\angle$ ACB = 30°. Determine the lengths of the sides BC

6. For what value of k, are the roots of the quadratic equation $3x^2 + 3kx + 27 = 0$ real and equal.

SECTION – B
Questions 6 to 12 carry 2 marks each.

7. Divide $3x^2 – x^3 – 3x + 5$ by $x – 1 – x^2$, and verify the division algorithm.

8. Two concentric circles are of radii 5 cm and 3 cm. Find the length of the chord of the larger circle which touches the smaller circle.

9. The length of the minute hand of a clock is 14 cm. Find the area swept by the minute hand in 5 minutes.

10. For which value of k will the following pair of linear equations have no solution?
    3x + y = 1
    (2k – 1) x + (k – 1) y = 2k + 1

11. Prove that $3 + 5\sqrt{2}$ is an irrational number.

12. How many terms of the AP : 24, 21, 18, . . . must be taken so that their sum is 78?

SECTION – C

Questions 13 to 22 carry 3 marks each.

13. Use Euclid's division lemma to show that the square of any positive integer is either of the form 3m or 3m + 1 for some integer m.

14. Verify that a median of a triangle divides it into two triangles of equal areas for Δ ABC whose vertices are A(4, – 6), B(3, –2) and C(5, 2).

OR

Find the centre of a circle passing through the points (6, – 6), (3, – 7) and (3, 3).

15. O is any point inside a rectangle ABCD (see below figure). Prove that $OB^2 + OD^2 = OA^2 + OC^2$.
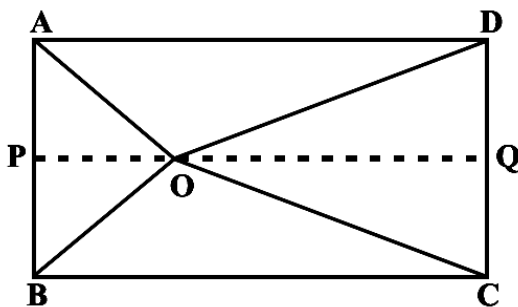

OR

Sides AB and AC and median AD of a triangle ABC are respectively proportional to sides PQ and PR and median PM of another triangle PQR. Show that Δ ABC ~ Δ PQR.

16. Find the area of the shaded region in below figure, where ABCD is a square of side 14 cm.
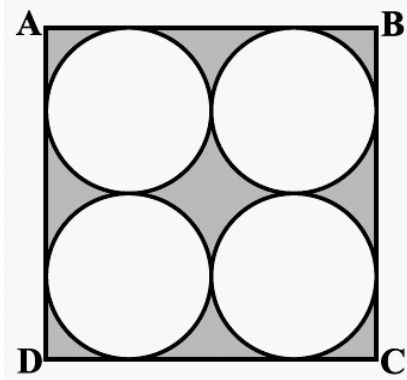
OR

On a square handkerchief, nine circular designs each of radius 7 cm are made (see below figure). Find the area of the remaining portion of the handkerchief.
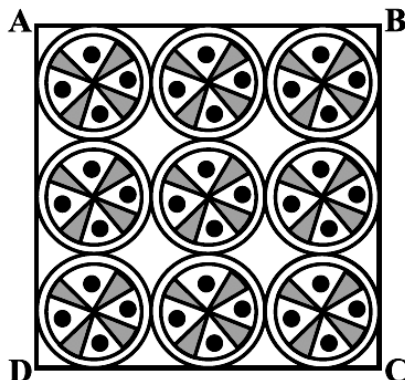
17. Obtain all other zeroes of $3x^4 + 6x^3 – 2x^2 – 10x – 5$, if two of its zeroes are $\sqrt{\dfrac{5}{3}}$ and $-\sqrt{\dfrac{5}{3}}$.

18. Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that $\angle PTQ = 2 \angle OPQ$.

19. If $\sin 3A = \cos (A - 26°)$, where 3A is an acute angle, find the value of A.

<div align="center">**OR**</div>

Evaluate: $\dfrac{\sin 18^0}{\cos 72^0} + \sqrt{3}\left(\tan 10^0 \tan 30^0 \tan 40^0 \tan 50^0 \tan 80^0\right)$

20. In Δ PQR, right-angled at Q, PR + QR = 25 cm and PQ = 5 cm. Determine the values of sin P, cos P and tan P.

21. A chord of a circle of radius 12 cm subtends an angle of 120° at the centre. Find the area of the corresponding segment of the circle. (Use π = 3.14 and $\sqrt{3}$ = 1.73)

22. Solve the equations:
$(a - b)x + (a + b) y = a^2 - 2ab - b^2$
$(a + b)(x + y) = a^2 + b^2$

SECTION – D
Questions 23 to 30 carry 4 marks each.

23. A 1.2 m tall girl spots a balloon moving with the wind in a horizontal line at a height of 88.2 m from the ground. The angle of elevation of the balloon from the eyes of the girl at any instant is 60°. After some time, the angle of elevation reduces to 30°. Find the distance travelled by the balloon during the interval.

24. A train travels a distance of 480 km at a uniform speed. If the speed had been 8 km/h less, then it would have taken 3 hours more to cover the same distance. Find the actual speed of the train.

<div align="center">**OR**</div>

In a class test, the sum of Shefali's marks in Mathematics and English is 30. Had she got 2 marks more in Mathematics and 3 marks less in English, the product of their marks would have been 210. Find her marks in the two subjects.

25. Prove that "If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio."

<div align="center">**OR**</div>

Prove that "If in a triangle, square of one side is equal to the sum of the squares of the other two sides, then the angle opposite the first side is a right angle."

26. Places A and B are 100 km apart on a highway. One car starts from A and another from B at the same time. If the cars travel in the same direction at different speeds, they meet in 5 hours. If they travel towards each other, they meet in 1 hour. What are the speeds of the two cars?

<div align="center">**OR**</div>

The area of a rectangle gets reduced by 9 square units, if its length is reduced by 5 units and breadth is increased by 3 units. If we increase the length by 3 units and the breadth by 2 units, the area increases by 67 square units. Find the dimensions of the rectangle.

27. 200 logs are stacked in the following manner: 20 logs in the bottom row, 19 in the next row, 18 in the row next to it and so on (see below figure). In how many rows are the 200 logs placed and how many logs are in the top row?
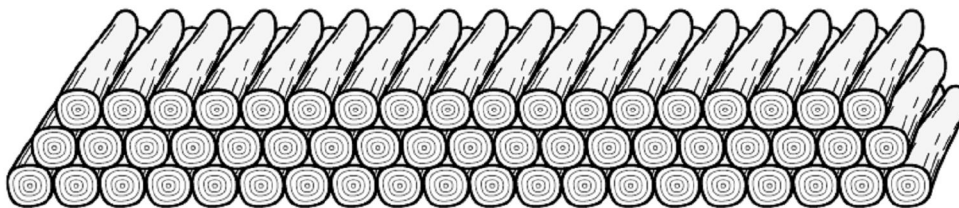
28. ABCD is a rectangle formed by the points A(–1, –1), B(– 1, 4), C(5, 4) and D(5, – 1). P, Q, R and S are the mid-points of AB, BC, CD and DA respectively. Is the quadrilateral PQRS a square? a rectangle? or a rhombus? Justify your answer.

29. Draw a triangle ABC with side BC = 7 cm, $\angle B = 45°$, $\angle A = 105°$. Then, construct a triangle whose sides are $\frac{4}{3}$ times the corresponding sides of $\triangle$ ABC.

30. Prove that $\dfrac{\tan\theta}{1-\cot\theta}+\dfrac{\cot\theta}{1-\tan\theta}=1+\sec\theta\cos ec\theta$