KENDRIYA VIDYALAYA SANGATHAN, HYDERABAD REGION
SAMPLE PAPER 01 FOR PERIODIC TEST III EXAM (2017-18)

SUBJECT: MATHEMATICS(041)

BLUE PRINT : CLASS X

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)
Algebra	Pair of Linear Equations in two variables	--	2(1)	3(1)	4(1)*	9(3)	
Algebra	Quadratic Equations	1(1)	--	--	4(1)*	5(2)	
Algebra	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)
Trigonometry	Some Applications of Trigonometry	--	--	--	4(1)	4(1)	
Geometry	Triangles	1(1)	--	3(1)*	4(1)*	8(3)	17(6)
Geometry	Circles	--	2(1)	3(1)	--	5(2)	
Geometry	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

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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. Find the values of k for quadratic equation $2x^2 + kx + 3 = 0$, so that they have two equal roots.

2. If $\sin A = \dfrac{3}{5}$, find the value of tanA.

3. If HCF of two numbers 96 and 404 is 4, then find LCM

4. Let $\Delta ABC \sim \Delta DEF$ and their areas be, respectively, 64 cm^2 and 121 cm^2. If EF = 15.4 cm, find BC.

5. Find the coordinates of a point A, where AB is the diameter of a circle whose centre is $(2, -3)$ and B is $(1, 4)$.

6. Which term of the AP : 21, 18, 15, . . . is -81?

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

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

8. Find the zeroes of the polynomial $2x^2 - 5x + 7$, and verify the relation between the coefficients and the zeroes of the polynomial.

9. Using Euclid's division algorithm, find the HCF of 2160 and 3520.

10. Solve $2x + 3y = 11$ and $2x - 4y = -24$ and hence find the value of 'm' for which $y = mx + 3$.

11. If tangents PA and PB from a point P to a circle with centre O are inclined to each other at angle of 80°, then find $\angle POA$

12. Find the sum of first 24 terms of the list of numbers whose nth term is given by $a_n = 3 + 2n$

SECTION – C
Questions 13 to 22 carry 3 marks each.

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

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14. Prove that the parallelogram circumscribing a circle is a rhombus.

15. If two zeroes of the polynomial $2x^4 - 3x^3 - 3x^2 + 6x - 2$ are $\sqrt{2}$ and $-\sqrt{2}$, find the other zeroes of the polynomial.

16. If A(–5, 7), B(– 4, –5), C(–1, –6) and D(4, 5) are the vertices of a quadrilateral, find the area of the quadrilateral ABCD.
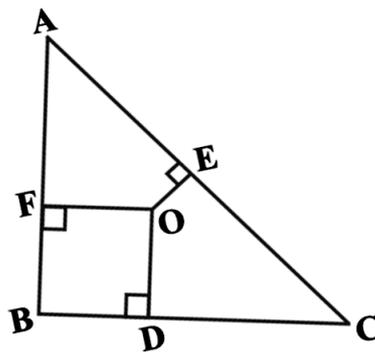
<div align="center">OR</div>

Find the area of the triangle formed by joining the mid-points of the sides of the triangle whose vertices are (0, –1), (2, 1) and (0, 3). Find the ratio of this area to the area of the given triangle.

17. In the below figure, O is a point in the interior of a triangle ABC, OD $\perp$ BC, OE $\perp$ AC and OF $\perp$ AB. Show that
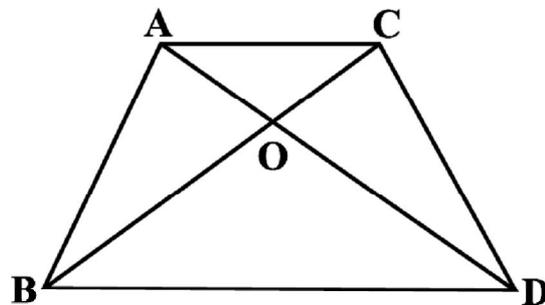(i) $OA^2 + OB^2 + OC^2 - OD^2 - OE^2 - OF^2 = AF^2 + BD^2 + CE^2$,
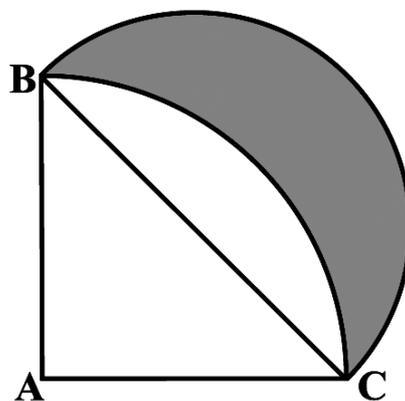(ii) $AF^2 + BD^2 + CE^2 = AE^2 + CD^2 + BF^2$.

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

In the below figure, ABC and DBC are two triangles on the same base BC. If AD intersects BC at O, show that $\dfrac{ar(\Delta ABC)}{ar(\Delta DBC)} = \dfrac{AO}{DO}$

18. In the below figure, ABC is a quadrant of a circle of radius 14 cm and a semicircle is drawn with BC as diameter. Find the area of the shaded region.

19. If $\tan(A + B) = \sqrt{3}$ and $\tan(A - B) = \dfrac{1}{\sqrt{3}}$; $0° < A + B \leq 90°$; $A > B$, find A and B.

OR

Prove that: $\dfrac{\cot A - \cos A}{\cot A + \cos A} = \dfrac{\cos ecA - 1}{\cos ecA + 1}$.

20. In Δ OPQ, right-angled at P, OP = 7 cm and OQ – PQ = 1 cm. Determine the values of sin Q and cos Q.

21. The sum of the digits of a two-digit number is 9. Also, nine times this number is twice the number obtained by reversing the order of the digits. Find the number.

22. A chord of a circle of radius 10 cm subtends a right angle at the centre. Find the area of the corresponding : (i) minor segment (ii) major sector. (Use $\pi = 3.14$)

OR

A horse is tied to a peg at one corner of a square shaped grass field of side 15 m by means of a 5 m long rope.
Find (i) the area of that part of the field in which the horse can graze.
(ii) the increase in the grazing area if the rope were 10 m long instead of 5 m. (Use $\pi = 3.14$)

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

23. A straight highway leads to the foot of a tower. A man standing at the top of the tower observes a car at an angle of depression of 30°, which is approaching the foot of the tower with a uniform speed. Six seconds later, the angle of depression of the car is found to be 60°. Find the time taken by the car to reach the foot of the tower from this point.

24. A motor boat whose speed is 18 km/h in still water takes 1 hour more to go 24 km upstream than to return downstream to the same spot. Find the speed of the stream.

OR

An express train takes 1 hour less than a passenger train to travel 132 km between Mysore and Bangalore (without taking into consideration the time they stop at intermediate stations). If the average speed of the express train is 11km/h more than that of the passenger train, find the average speed of the two trains.

25. Prove that "The ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides."

OR

Prove that in a right triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides.

26. If the sum of first 7 terms of an AP is 49 and that of 17 terms is 289, find the sum of first n terms.

27. Determine the ratio in which the line 2x + y – 4 = 0 divides the line segment joining the points A(2, – 2) and B(3, 7).

28. Draw a circle of radius 3 cm. Take two points P and Q on one of its extended diameter each at a distance of 7 cm from its centre. Draw tangents to the circle from these two points P and Q.

29. Prove that $\dfrac{\cos A - \sin A + 1}{\cos A + \sin A - 1} = \cos ec\,A + \cot A$

30. Draw the graphs of the equations x – y + 1 = 0 and 3x + 2y – 12 = 0. Determine the coordinates of the vertices of the triangle formed by these lines and the x-axis, and shade the triangular region.

OR

Solve the equations: $\dfrac{1}{3x+y} + \dfrac{1}{3x-y} = \dfrac{3}{4}$ *and* $\dfrac{1}{2(3x+y)} - \dfrac{1}{2(3x-y)} = \dfrac{-1}{8}$