

KENDRIYA VIDYALAYA SANGATHAN, HYDERABAD REGION
SAMPLE PAPER 08 (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	--	--	3(1)	--	3(1)	20(8)
	Pair of Linear Equations in two variables	--	2(1)	3(1)	--	5(2)	
	Quadratic Equations	1(1)	--	--	4(1)*	5(2)	
	Arithmetic progression	1(1)	2(1)	--	4(1)	7(3)	
Coordinate Geometry	Coordinate Geometry	1(1)	2(1)	3(1)*	--	6(3)	6(3)
Trigonometry	Introduction to Trigonometry	1(1)	--	3(1)*	4(1)	8(3)	12(4)
	Some Applications of Trigonometry	--	--	--	4(1)	4(1)	
Geometry	Triangles	1(1)	--	3(1)*	4(1)*	8(3)	15(5)
	Circles	--	--	3(1)	--	3(1)	
	Constructions	--	--	--	4(1)	4(1)	
Mensuration	Areas Related to Circles	--	--	3(1)	--	3(1)	10(3)
	Surface Areas and Volumes	--	--	3(1)*	4(1)	7(2)	
Statistics & probability	Statistics	--	--	3(1)	4(1)*	7(2)	11(4)
	Probability	--	4(2)	--	--	4(2)	
	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
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SECTION – A

Questions 1 to 6 carry 1 mark each.

1. Find the 25th term of the A.P. $-5, \frac{-5}{2}, 0, \frac{5}{2}, \dots$
2. State Euclid's Division Lemma.
3. Find the values of k for which the quadratic equation $(k + 4)x^2 + (k + 1)x + 1 = 0$ has equal roots.
4. For what values of k are the points (8, 1), (3, -2k) and (k, -5) collinear ?
5. If $\sin 3A = \cos (A - 26^\circ)$, where 3A is an acute angle, find the value of A.
6. $\triangle ABC \sim \triangle DEF$ and their areas be, respectively, 64 cm^2 and 121 cm^2 . If $EF = 15.4 \text{ cm}$, find the value of BC.

SECTION – B

Questions 6 to 12 carry 2 marks each.

7. Show that the points (a, a), (-a, -a) and $(-\sqrt{3}a, \sqrt{3}a)$ are the vertices of an equilateral triangle.
8. If the HCF of 408 and 1032 is expressible in the form of $1032m - 408x5$, find m.
9. A bag contains 18 balls out of which x balls are red. (i) If one ball is drawn at random from the bag, what is the probability that it is not red? (ii) If 2 more red balls are put in the bag, the probability of drawing a red ball will be times the probability of drawing a red ball in the first case. Find the value of x.
10. A box contains cards bearing numbers from 6 to 70. If one card is drawn at random from the box, find the probability that it bears (i) a one digit number (ii) a number divisible by 5
11. For what value of k, the following pair of linear equations has infinite number of solutions:
 $2x + 3y = 2; \quad (k+2)x + (2k+1)y = 2(k-1).$

12. The fourth term of an A.P. is 11. The sum of the fifth and seventh terms of the A.P. is 34. Find its common difference.

SECTION – C

Questions 13 to 22 carry 3 marks each.

13. Show that any positive odd integer is of the form $6q + 1$ or $6q + 3$ or $6q + 5$ where $q \in \mathbb{Z}$.
14. Diagonals of a trapezium ABCD with $AB \parallel CD$ intersect at O. If $AB = 2CD$, find the ratio of areas of triangles AOB and COD.

OR

Prove that the sum of the squares of the sides of a rhombus is equal to the sum of the squares of its diagonals.

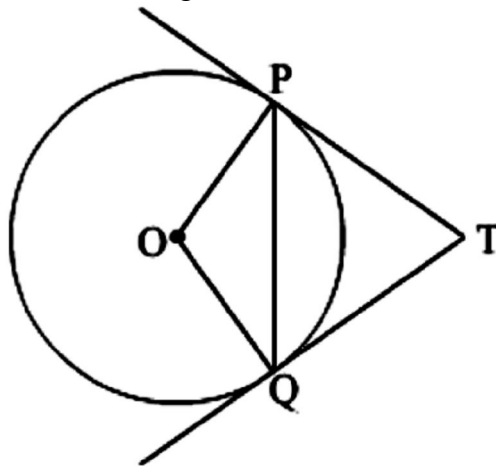
15. The base BC of an equilateral triangle ABC lies on y-axis. The coordinates of point C are (0, -3). The origin is the mid-point of the base. Find the coordinates of the points A and B.

OR

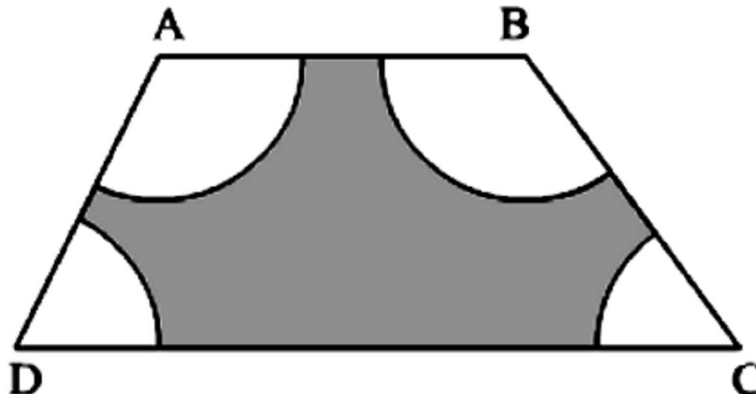
Point A lies on the line segment PQ joining $P(6, -6)$ and $Q(-4, -1)$ in such a way that $\frac{PA}{PQ} = \frac{2}{5}$.

If point P also lies on the line $3x + k(y + 1) = 0$, find the value of k.

16. In the below Figure, PQ is a chord of length 8 cm of a circle of radius 5 cm. The tangents at P and Q intersect at a point T. Find the lengths of TP and TQ.



17. In the below Figure, ABCD is a trapezium with $AB \parallel DC$, $AB = 18$ cm, $DC = 32$ cm and the distance between AB and DC is 14 cm. If arcs of equal radii 7 cm have been drawn, with centres A, B, C and D, then find the area of the shaded region.



18. Ritu can row downstream 20 km in 2 hours, and upstream 4 km in 2 hours. Find her speed of rowing in still water and the speed of the current.
19. Find the zeroes of the quadratic polynomial $6x^2 - 7x - 3$ and verify the relationship between the zeroes and the coefficients.
20. A metallic cylinder has radius 3 cm and height 5 cm. To reduce its weight, a conical hole is drilled in the cylinder. The conical hole has a radius of $\frac{3}{2}$ cm and its depth is $\frac{8}{9}$ cm. Calculate the ratio of the volume of metal left in the cylinder to the volume of metal taken out in conical shape.

OR

A solid right-circular cone of height 60 cm and radius 30 cm is dropped in a right-circular cylinder full of water of height 180 cm and radius 60 cm. Find the volume of water left in the cylinder, in cubic metres. (Use $\pi = \frac{22}{7}$)

21. Evaluate:
$$\frac{\sin^2 45^\circ + \frac{3}{4} \operatorname{cosec}^2 30^\circ - \cos 60^\circ + \tan^2 60^\circ}{\sin^2 30^\circ + \cos^2 60^\circ + \frac{1}{2} \sec^2 45^\circ}$$

OR

Prove that:
$$\frac{\cos A - \sin A + 1}{\cos A + \sin A - 1} = \operatorname{sec} A + \tan A.$$

22. Find the average height of maximum number of students from the following distribution:

Height(in cm)	160-162	163-165	166-168	169-171	172-174
No. of students	15	118	142	127	18

SECTION – D

Questions 23 to 30 carry 4 marks each.

23. Two poles of equal heights are standing opposite to each other on either side of the road which is 80 m wide. From a point P between them on the road, the angle of elevation of the top of a pole is 60° and the angle of depression from the top of another pole at point P is 30° . Find the heights of the poles and the distances of the point P from the poles.
24. Draw a circle of radius 3 cm. From a point P, 7 cm away from its centre draw two tangents to the circle. Measure the length of each tangent.
25. In an AP of 50 terms, the sum of first 10 terms is 210 and the sum of its last 15 terms is 2565. Find the A.P.
26. A fast train takes 3 hours less than a slow train for a journey of 600 km. If the speed of the slow train is 10 km/hour less than that of the fast train, find the speeds of the two trains.

OR

The side of a square exceeds the side of another square by 4 cm and the sum of the areas of the two squares is 400 sq. cm. Find the dimensions of the squares.

27. If $\operatorname{cosec} \theta - \sin \theta = a^3$ and $\operatorname{sec} \theta - \cos \theta = b^3$, prove that $a^2 b^2 (a^2 + b^2) = 1$

28. Milk in a container, which is in the form of a frustum of a cone of height 30 cm and the radii of whose lower and upper circular ends are 20 cm and 40 cm respectively, is to be distributed in a camp for flood victims. If this milk is available at the rate of Rs 35 per litre and 880 litres of milk is needed daily for a camp, find how many such containers of milk are needed for a camp and what cost will it put on the donor agency for this. What value is indicated through this by the donor agency ?

29. Prove that “In a triangle, if the square of one side is equal to the sum of the squares of the other two sides, then the angle opposite to the first side is a right angle.

OR

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

30. If the median of the distribution given below is 28.5, find the values of x and y .

C. I.	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	Total
F	5	x	20	15	y	5	100

OR

For the following distribution, draw the cumulative frequency curve more than type and hence obtain the median from the graph.

Marks	Below 10	Below 20	Below 30	Below 40	Below 50	Below 60
No. of Students	6	15	29	41	60	70