KENDRIYA VIDYALAYA SANGATHAN, HYDERABAD REGION
SAMPLE PAPER 10 (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	--	--	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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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 105th term of the A.P. $4, \ 4\frac{1}{2}, \ 5, \ 5\frac{1}{2}, \ 6,\dots\dots$.

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

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. In right triangle ABC, $\angle B = 90^0$, AB = 3cm and AC = 6cm. Find $\angle C$ and $\angle A$.

6. If a ladder 10 m long reaches a window 8 m above the ground, then find the distance of the foot of the ladder from the base of the wall.

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

7. Prove that the points $(2, -2), (-2, 1)$ and $(5, 2)$ are the vertices of a right angled triangle.

8. Find the HCF and LCM of 6, 72 and 120, using the prime factorisation method.

9. A game consist of tossing a one-rupee coin 3 times and noting the outcome each time. Ramesh will win the game if all the tosses show the same result, (i.e. either all thee heads or all three tails) and loses the game otherwise. Find the probability that Ramesh will lose the game.

10. 20 tickets, on which numbers 1 to 20 are written, are mixed thoroughly and then a ticket is drawn at random out of them. Find the probability that the number on the drawn ticket is (i) a multiple of 3 or 7 (ii) a prime number.

11. Solve for x and y: $217x + 131y = 913$; $131x + 217y = 827$

12. If the ratio of sum of the first m and n terms of an AP is $m^2 : n^2$, show that the ratio of its mth and nth terms is $(2m − 1) : (2n − 1)$.

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. In the below left Figure, if $\angle 1 = \angle 2$ and $\Delta NSQ \cong \Delta MTR$, then prove that $\Delta PTS \sim \Delta PRQ$.
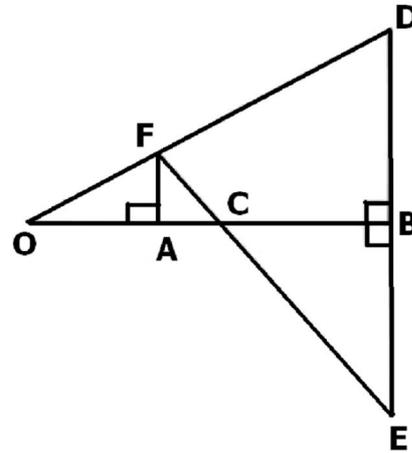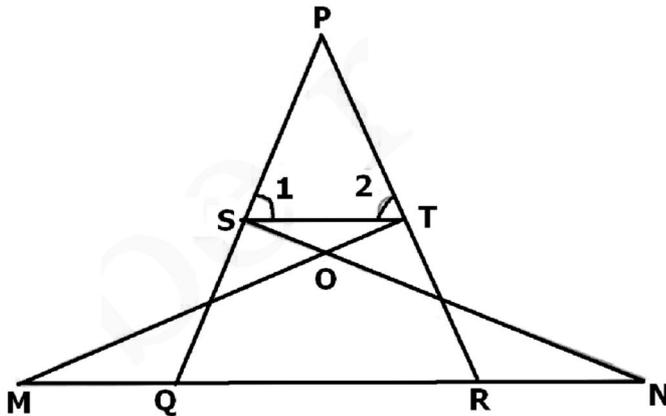

OR

In the above right sided Figure, OB is the perpendicular bisector of the line segment DE, FA $\perp$ OB and FE intersects OB at the point C. Prove that $\dfrac{1}{OA} + \dfrac{1}{OB} = \dfrac{2}{OC}$

15. The co-ordinates of the points A, B and C are (6, 3), (−3, 5) and (4, −2) respectively. P(x, y) is any point in the plane. Show that $\dfrac{ar(\Delta PBC)}{ar(\Delta ABC)} = \left| \dfrac{x + y − 2}{7} \right|$

OR

If the point C (−1, 2) divides internally the line-segment joining the points A (2, 5) and B (x, y) in the ratio 3 : 4, find the value of $x^2 + y^2$.

16. In the below figure, there are two concentric circles of radii 6 cm and 4 cm with centre O. If AP is a tangent to the larger circle and BP to the smaller circle and length of AP is 8 cm, find the length of BP.
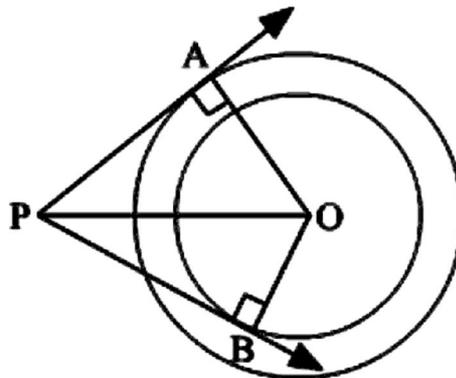
17. In the below figure, a chord AB of a circle, with centre O and radius 10 cm subtends a right angle at the centre of the circle. Find the area of the minor segment AQBP. Hence find the area of major segment ALBQA. (use $\pi = 3.14$)
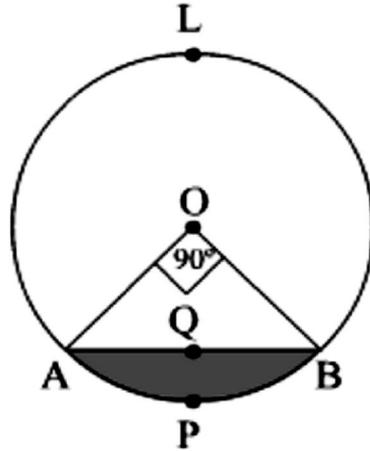
18. A lending library has a fixed charge for the first three days and an additional charge for each day thereafter. Saritha paid Rs 27 for a book kept for seven days, while Susy paid Rs 21 for the book she kept for five days. Find the fixed charge and the charge for each extra day.

19. If the zeroes of the polynomial $2x^3 - 15x^2 + 37x - 30$ are a – b, a, a + b, find all the zeroes.

20. A cylindrical tub, whose diameter is 12 cm and height 15 cm is full of ice-cream. The whole ice-cream is to be divided into 10 children in equal ice-cream cones, with conical base surmounted by hemispherical top. If the height of conical portion is twice the diameter of base, find the diameter of conical part of ice-cream cone.

OR

A metal container, open from the top, is in the shape of a frustum of a cone of height 21 cm with radii of its lower and upper circular ends as 8 cm and 20 cm respectively. Find the cost of milk which can completely fill the container at the rate of Rs 35 per litre.

21. Evaluate: $\dfrac{3\cos 55^0}{7\sin 35^0} - \sqrt{3}\left\{\tan 10^0 \tan 30^0 \tan 40^0 \tan 50^0 \tan 80^0\right\}$

OR

Prove that: $(1 - \sin\theta + \cos\theta)^2 = 2(1 + \cos\theta)(1 - \sin\theta)$

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. A vertical tower stands on a horizontal plane and is surmounted by a flagstaff of height 5 m. From a point on the ground the angles of elevation of the top and bottom of the flagstaff are 60° and 30° respectively. Find the height of the tower and the distance of the point from the tower. (Take $\sqrt{3} = 1.732$)

24. Draw a ΔABC in which AB = 4 cm, BC = 5 cm and AC = 6 cm. Then construct another triangle whose sides are $\dfrac{5}{3}$ of the corresponding sides of ΔABC.

25. Reshma wanted to save at least Rs 6,500 for sending her daughter to school next year (after 12 month.) She saved Rs 450 in the first month and raised her savings by Rs 20 every next month. How much will she be able to save in next 12 months? Will she be able to send her daughter to the school next year? What value is reflected in this question.

26. In a flight for 3000 km, an aircraft was slowed down due to bad weather. Its average speed for the trip was reduced by 100 km/hr and consequently time of flight increased by one hour. Find the original duration of flight.

OR

A pole has to be erected at a point on the boundary of a circular park of diameter 17 m in such a way that the differences of its distances from two diametrically opposite fixed gates A and B on the boundary is 7 metres. Find the distances from the two gates where the pole is to be erected.

27. Prove that: $\dfrac{\sin A + \cos A}{\sin A - \cos A} + \dfrac{\sin A - \cos A}{\sin A + \cos A} = \dfrac{2}{\sin^2 A - \cos^2 A} = \dfrac{2}{2\sin^2 A - 1} = \dfrac{2}{1 - 2\cos^2 A}$.

28. In the below figure, it is shown a right circular cone of height 30 cm. A small cone is cut off from the top by a plane parallel to the base. If the volume of the small cone is $\dfrac{1}{27}$ of the volume of cone, find at what height above the base is the section made.
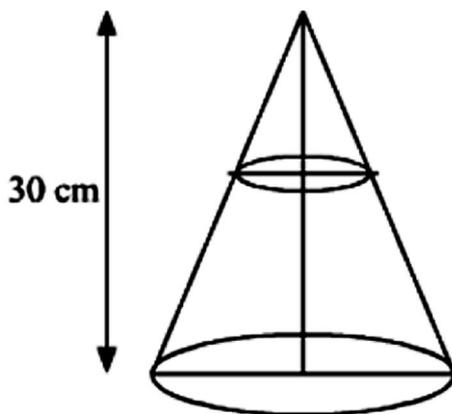
29. Prove that "In a triangle, if the square of one side is equal to the sum of the squares of the other two sides, then the angle opposite to the first side is a right angle.

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