KENDRIYA VIDYALAYA GACHIBOWLI, GPRA CAMPUS, HYD–32

SAMPLE PAPER 06 (2019-20)

SUBJECT: MATHEMATICS(041) (STANDARD)

BLUE PRINT : CLASS X

Unit	Chapter	MCQ (1 mark)	FIB (1 mark)	VSA (1 mark)	SA–I (2 marks)	SA–II (3 marks)	LA (4 marks)	Total	Unit Total
Number system	**Real Numbers**	2(2)	--	1(1)	--	**3(1)***	--	**6(3)**	**6(3)**
Algebra	**Pair of Linear Equations in two variables**	1(1)	--	--	--	**3(1)***	--	**4(2)**	**20(11)**
	Polynomials	--	**1(1)***	--	--	3(1)	--	**3(1)**	
	Quadratic Equations	--		1(1)	--	--	**4(1)***	**6(3)**	
	Arithmetic progression	--	1(1)	1(1)	2(1)	3(1)	--	**7(5)**	
Coordinate Geometry	**Coordinate Geometry**	3(3)	--	--	--	**3(1)****	--	**6(4)**	**6(4)**
Trigonometry	**Introduction to Trigonometry**	3(3)	--	--	--	**3(1)***	--	**6(4)**	**12(6)**
	Some Applications of Trigonometry	--	--	--	**2(1)****	--	4(1)	**6(2)**	
Geometry	**Triangles**	--	1(1)	1(1)	**2(1)***	--	4(1)	**8(4)**	**15(7)**
	Circles	--	--	**1(1)***	2(1)	--	--	**3(2)**	
	Constructions	--	--	--	--	--	**4(1)***	**4(1)**	
Mensuration	**Areas Related to Circles**	--	--	--	--	3(1)	--	**3(1)**	**10(4)**
	Surface Areas and Volumes	--	1(1)	--	**2(1)****	--	**4(1)***	**7(3)**	
Statistics & probability	**Statistics**	1(1)	--	--	--	**3(1)****	4(1)	**8(3)**	**11(5)**
	Probability	--	1(1)	--	**2(1)***	--	--	**3(2)**	
	Total	**10(10)**	**5(5)**	**5(5)**	**12(6)**	**24(8)**	**24(6)**	**80(30)**	**80(40)**

Note: * - Internal Choice Questions and Yellow shaded with ** - PISA type questions

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SAMPLE PAPER 06 (2019-20)

SUBJECT: MATHEMATICS **MAX. MARKS : 80**

CLASS : X **DURATION : 3 HRS**

General Instruction:

(i) All the questions are compulsory.

(ii) The question paper consists of 40 questions divided into 4 sections A, B, C, and D.

(iii) **Section A** comprises of 20 questions of **1 mark** each. **Section B** comprises of 6 questions of **2 marks** each. **Section C** comprises of 8 questions of **3 marks** each. **Section D** comprises of 6 questions of **4 marks** each.

(iv) There is no overall choice. However, an internal choice has been provided in two questions of 1 mark each, two questions of 2 marks each, three 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 20 carry 1 mark each.

1. The ratio between the LCM and HCF of 5 15 and 20 is
(a) 9 : 1 (b) 4 : 3 (c) 11 : 1 (d) 12 : 1

2. If A = 2n + 13, B = n + 7, where n is a natural number, then HCF of A and B is
(a) 2 (b) 1 (c) 3 (d) 4

3. The perpendicular distance of A(5, 12) from the x-axis is
(a) 12 units (b) 5 units (c)13 units (d)none of these

4. The midpoint of side BC of traingle ABC, with A(1, -4) and the midpoints of the sides through A being (2, -1) and (0, –12) is
(a)(3, 2) (b)(3, –2) (c) (–3, 2) (d) none of these

5. If $\sqrt{3}\ \sin\theta - \cos\theta = 0$ and $0^0 < \theta < 90^0$, then the value of θ is
(a) 30^0 (b) 60^0 (c) 45^0 (d) none of these

6. The value of x if $\tan 3x = \sin 45^0 \cos 45^0 + \sin 30^0$ is
(a) 30^0 (b) 45^0 (c) 15^0 (d) none of these

7. The value of A if $2\sin 2A = \sqrt{3}$ is
(a) 30^0 (b) 45^0 (c) 15^0 (d) none of these

8. If the midpoint of the line segment joining A($\frac{x}{2}$, 0) and B(x + 1, –4) is C(5, –2), then the value of x is
(a) 6 (b) –6 (c) –1 (d)none of these

9. The value of k if the system of equations kx + 3y + (3 – k) = 0; 12x + ky – k = 0 has infinitely many solutions is
(a) 6 (b) 8 (c) 4 (d)none of these

10. The modal class from the following data is:

Marks	Below 10	Below 20	Below 30	Below 40	Below 50
Number of students	15	45	90	102	120

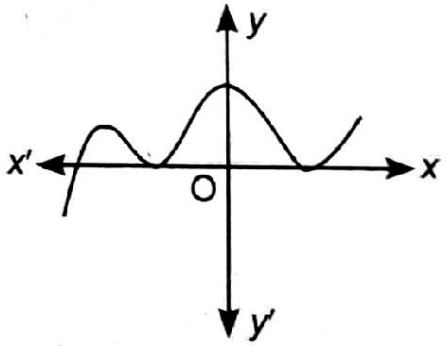
(a) 20 – 30 (b) 30 – 40 (c) 40 – 50 (d) none of these

11. Two coins are tossed simultaneously, then the probability of getting exactly one head is _____

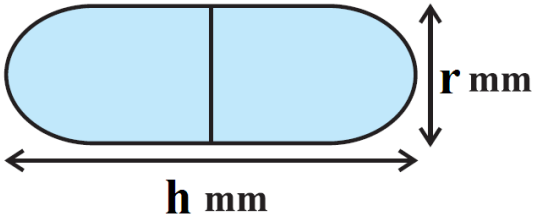
12. If $x = -\frac{1}{2}$ is a solution of the quadratic equation $3x^2 + 2kx - 3 = 0$, then the value of k is ___

OR

The graph of y = f(x) is given below, for some polynomial f(x), the number of zeroes of f(x) is _____.



13. A medicine capsule is in the shape of a cylinder with two hemispheres stuck to each of its ends (see below figure). The surface area of the capsule is _____

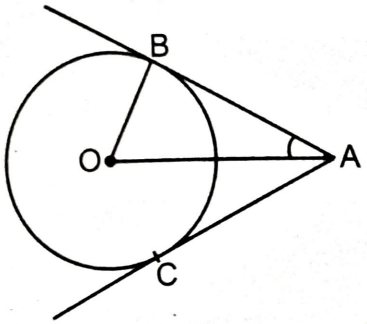


14. The 17^{th} term of an AP exceeds its 10^{th} term by 7, then the common difference is _____.

15. A ladder 10 m long reaches a window 8 m above the ground. The distance of the foot of the ladder from base of the wall is _____

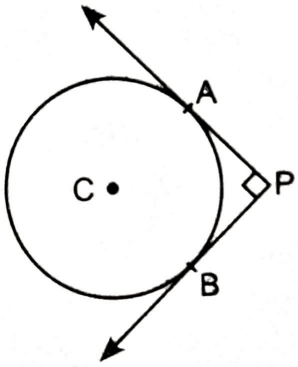
16. Express each of the following positive integers as the product of its prime factors: (i) 140 (ii) 156

17. In below figure, AB and AC are angents to a circle with centre O and radius 8 cm. If OA = 17 cm, then find the length of AC (in cm)



OR

In below figure PA and PB are two tangents drawan from an external point P to a circle with centre C and radius 4 cm. If PA ⊥ PB, then find the length of each tangent.



18. The areas of two similar triangles ΔABC and ΔDEF are 144 cm^2 and 81 cm^2, respectively. If the longest side of larger ΔABC be 36 cm, then find the longest side of the similar triangle ΔDEF .

19. Find the discriminant of the quadratic equation $2x^2 - 4x + 3 = 0$, and hence find the nature of its roots.

20. For what value of p, are 2p + 1, 13, 5p – 3 three consecutive terms of an AP?

SECTION – B

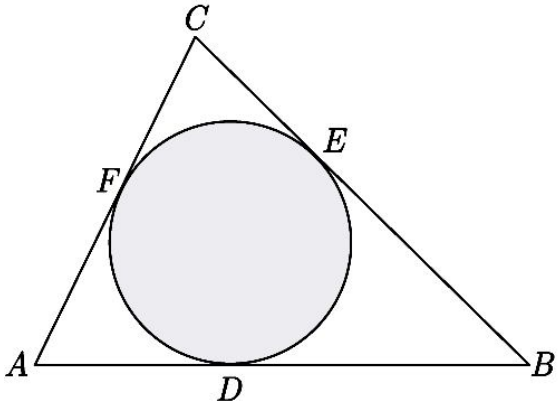
Questions 21 to 26 carry 2 marks each.

21. Two different dice are rolled together. Find the probability of getting : (i) the sum of numbers on two dice to be 5. (ii) even numbers on both dice.

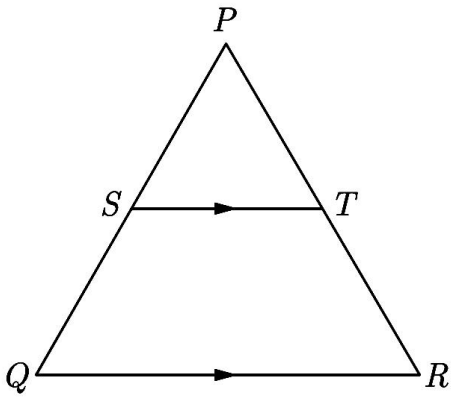
OR

A box contains 20 cards numbered from 1 to 20. A card is drawn at random from the box. Find the probability that the number on the drawn card is (i) divisible by 2 or 3 (ii) a prime number

22. A circle is inscribed in a ΔABC, with sides AC, AB and BC as 8 cm, 10 cm and 12 cm respectively (see below figure). Find the length of BE and CF.



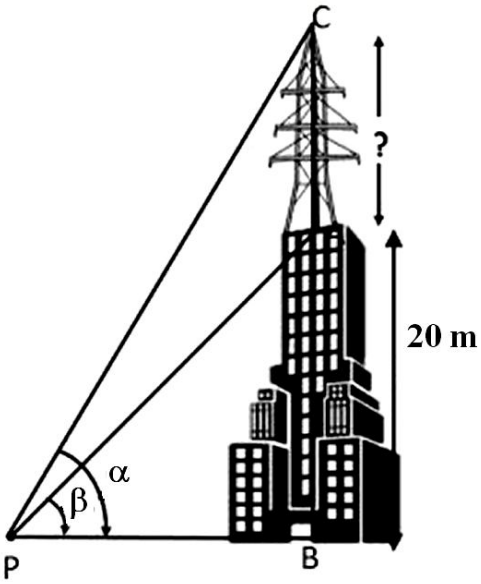
23. In the given figure, in a triangle PQR,ST | | QR and $\frac{PS}{SQ}=\frac{3}{5}$ and PR = 28 cm, find PT.



OR

ABCD is a trapezium in which AB | | CD and its diagonals intersect each other at the point O. Show that $\frac{AO}{BO}=\frac{CO}{DO}$

24. A tower is a tall structure, taller than it is wide, often by a significant margin. Towers are distinguished from masts by their lack of guy-wires and are therefore, along with tall apartment buildings, self-supporting structures. Towers are specifically distinguished from "apartment buildings" in that they are not built to be habitable but to serve other functions.
Karan went to city and he saw a transmission tower fixed at the top of a high building. He come to know that the height of the building is 20m. From a point on the ground, the angles of elevation of the top and the bottom of a transmission tower are α and β respectively such that $\cos\alpha = \sin(150^0 - \alpha)$ and $\sin2\beta = \cos(135^0 - 3\beta)$. Find the height of the tower.



25. In a hospital used water is collected in a cylindrical tank of diameter 2 m and height 5 m. After recycling, this water is used to irrigate a park of hospital whose length is 25 m and breadth is 20 m. If tank is filled completely then what will be height of standing water used for irrigating the park.

26. Find the middle term of the A.P. 6, 13, 20, ... , 216.

SECTION – C

Questions 27 to 34 carry 3 marks each.

27. Show that the product of three consecutive natural numbers is divisible by 6.

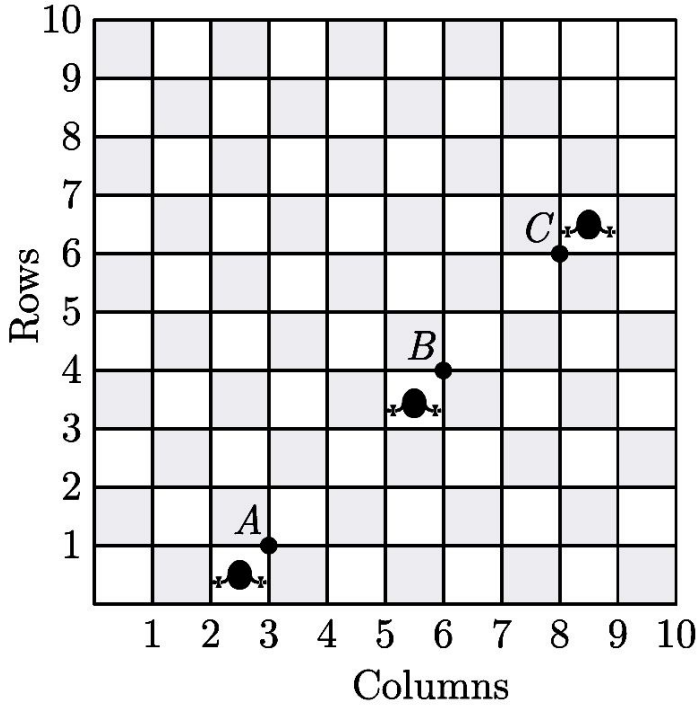
OR

Find the HCF and LCM of 6, 72 and 120 using fundamental theorem of arithmetic.

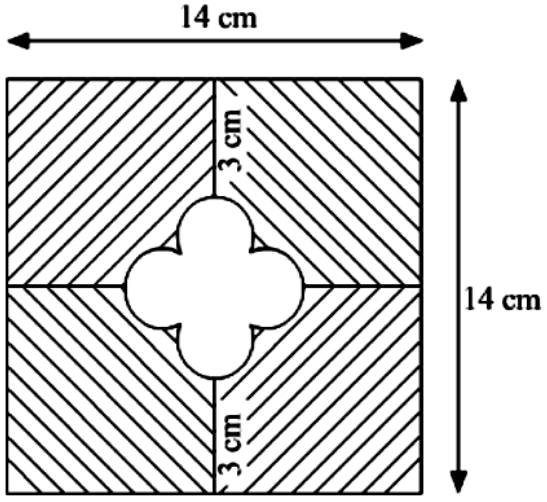
28. Given figure shows the arrangement of desks in a classroom. Ashima, Bharti and Camella are seated at A(3, 1), B (6, 4) and C (8, 6) respectively.

(i) Do you think they are seated in a line? Give reasons for your answer.

(ii) Which mathematical concept is used in the above problem?



29. In the below figure, find the area of the shaded region. [Use $\pi = 3.14$]



30. Find all the zeroes of the polynomial $2x^4 - 9x^3 + 5x^2 + 3x - 1$, if two of its zeroes are $2+\sqrt{3}$ and $2-\sqrt{3}$.

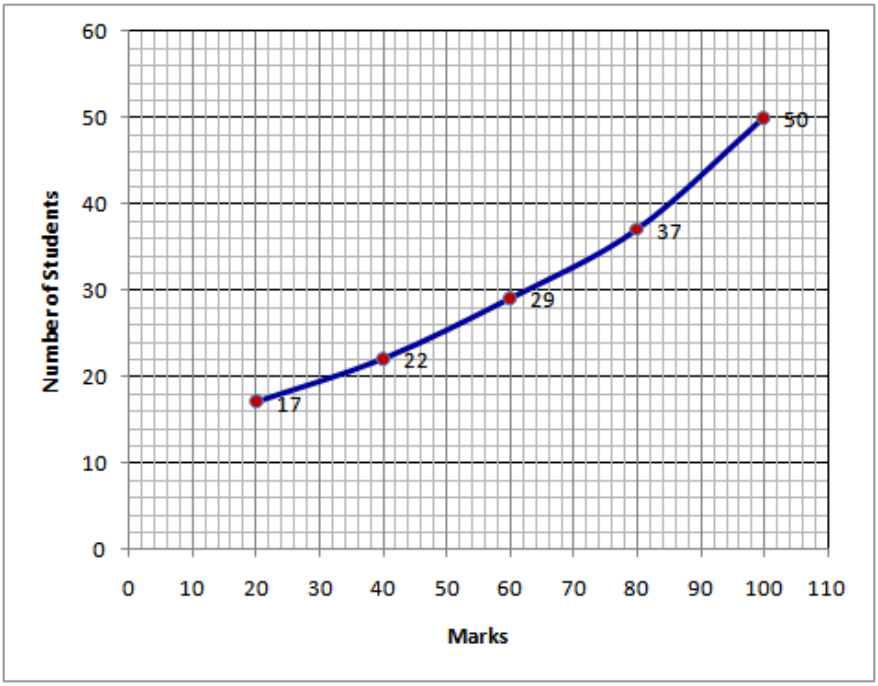
31. Ramkali required Rs 2,500 after 12 weeks to send her daughter to school. She saved Rs 100 in the first week and increased her weekly saving by Rs 20 every week. Find whether she will be able to send her daughter to school after 12 weeks.

32. 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

Points A and B are 150 km apart on a highway. Two cars start A and B at the same time. If they move in the same direction they meet in 15 hours. But if they move in the opposite direction, they meet in 1 hour. Find their speeds.

33. Aditya decided to collect the Science marks of his class. The total number of students is 50. After collecting the data, he analyzed the data and prepared a report on the Science marks of his class. Using this report, he drew the following graph for a particular of Science marks of his class:



Based on the above graph, answer the following questions:
(i) Form the frequency distribution table for the data.
(ii) Find the median marks of his class from the graph and verify the result by using formula.
(iii) Obtain the Mode of the data if mean rainfall is 52 cm

34. Evaluate: $\dfrac{\sec\theta\cos ec(90^0-\theta)-\tan\theta\cot(90^0-\theta)+(\sin^2 35^0+\sin^2 55^0)}{\tan 10^0\tan 20^0\tan 45^0\tan 70^0\tan 80^0}$

OR

If $(\tan\theta+\sin\theta)=m$ and $(\tan\theta-\sin\theta)=n$ prove that $(m^2-n^2)^2=16mn$

SECTION – D

Questions 35 to 40 carry 4 marks each.

35. From a point P on the ground the angle of elevation of the top of a tower is 30° and that of the top of a flag staff fixed on the top of the tower, is 60°. If the length of the flag staff is 5 m, find the height of the tower.

36. 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.

OR

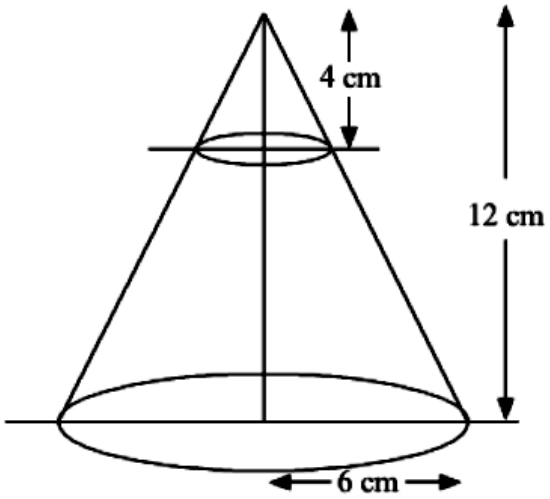
Construct a triangle ABC with BC = 7 cm, $\angle B = 60°$ and AB = 6 cm. Construct another triangle whose sides are 7/4 times the corresponding sides of ΔABC.

37. The numerator of a fraction is 3 less than its denominator. If 2 is added to both the numerator and the denominator, then the sum of the new fraction and original fraction is $\frac{29}{20}$. Find the original fraction.

OR

Solve for x : $\frac{2}{x+1}+\frac{3}{2(x-2)}=\frac{23}{5x}, x \neq 0,-1,2$

38. In the below figure, from the top of a solid cone of height 12 cm and base radius 6 cm, a cone of height 4 cm is removed by a plane parallel to the base. Find the total surface area of the remaining solid.



OR

A well of diameter 4 m is dug 14 m deep. The earth taken out is spread evenly all around the well to form a 40 cm high embankment. Find the width of the embankment.

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

40. Find the missing frequencies f_1 and f_2 in table given below; it is being given that the mean of the given frequency distribution is 145.

Class	100-120	120-140	140-160	160-180	180-200	**Total**
Frequency	10	f_1	f_2	15	5	**80**