

KENDRIYA VIDYALAYA GACHIBOWLI, GPRA CAMPUS, HYD-32
SAMPLE PAPER 10 (2019-20)

SUBJECT: MATHEMATICS(241) (BASIC)

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	3(3)	--	--	--	3(1)*	--	6(4)	6(4)
Algebra	Polynomials	2(2)	--	--	2(1)	3(1)	--	7(4)	20(9)
	Pair of Linear Equations in two variables	--	1(1)*	--	--	3(1)	--	3(1)	
	Quadratic Equations	--	--	--	--	--	4(1)	5(2)	
	Arithmetic progression	--	--	1(1)	--	--	4(1)*	5(2)	
Coordinate Geometry	Coordinate Geometry	2(2)	1(1)	--	--	3(1)**	--	6(4)	6(4)
Trigonometry	Introduction to Trigonometry	--	2(2)	1(1)*	2(1)*	3(1)*	--	8(5)	12(6)
	Some Applications of Trigonometry	--	--	--	--	--	4(1)	4(1)	
Geometry	Triangles	--	1(1)	1(1)	--	--	4(1)*	6(3)	15(7)
	Circles	1(1)	--	--	2(1)	3(1)	--	6(3)	
	Constructions	--	--	--	--	3(1)*	--	3(1)	
Mensuration	Areas Related to Circles	--	--	1(1)	2(1)	3(1)	--	6(3)	10(4)
	Surface Areas and Volumes	--	--	--	--	--	4(1)*	4(1)	
Statistics & probability	Statistics	1(1)	--	--	--	--	4(1)	5(2)	11(6)
	Probability	1(1)	--	1(1)	2(1) 2(1)*	--	--	6(4)	
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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SUBJECT: MATHEMATICS
CLASS : X

MAX. MARKS : 80
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. For any integer a and 3, there exists unique integers q and r such that $a = 3q + r$. Find the possible values of r .
(a) 2 (b) 1 (c) 0 (d) All of these
2. The HCF of two numbers is 145 and their LCM is 2175. If one number is 725, then find the other number.
(a) 145 (b) 435 (c) 725 (d) none of these
3. What is the HCF of smallest composite number and smallest prime number?
(a) 2 (b) 1 (c) 0 (d) none of these
4. Which are the zeroes of $p(x) = 6x^2 - 7x - 3$:
(a) 5, -2 (b) -5, 2 (c) -5, -2 (d) none of these
5. If the sum of the zeroes of the polynomial $3x^2 - kx + 6$ is 3, then the value of k is:
(a) 3 (b) -3 (c) 6 (d) 9
6. Find the ordinate of a point whose abscissa is 10 and which is at a distance of 10 units from the point $P(2, -3)$.
(a) 3 (b) -9 (c) both (a) or (b) (d) none of these
7. Consider the following distribution:
- | Marks | Above 0 | Above 10 | Above 20 | Above 30 | Above 40 | Above 50 |
|-----------------|---------|----------|----------|----------|----------|----------|
| No. of Students | 63 | 58 | 55 | 51 | 48 | 42 |
- The frequency of the class 30 – 40 is
(a) 3 (b) 4 (c) 48 (d) 41
8. A box contains 3 blue, 2 white, and 5 red marbles. If a marble is drawn at *random* from the box, then what is the probability that the marble will be red or blue?
(a) 1 (b) $\frac{4}{5}$ (c) $\frac{1}{5}$ (d) $\frac{2}{5}$
9. The distance of $A(5, -12)$ from the origin is
(a) 12 (b) 11 (c) 13 (d) 10

10. 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 $\angle POA$ is equal to
 (a) 60° (b) 70° (c) 80° (d) 50°
11. The values of k for which the points (8, 1), (3, -2k) and (k, -5) collinear is _____
12. If $\cos \theta = \frac{1}{2}$, $\sin \phi = \frac{1}{2}$ then value of $\theta + \phi$ is _____
13. The value of $2\sin^2 30^\circ - 3\cos^2 45^\circ + \tan^2 60^\circ + 3\sin^2 90^\circ$ is _____
14. If a ladder 10 m long reaches a window 8 m above the ground, then the distance of the foot of the ladder from the base of the wall is _____
15. If $3x^2 - 2kx + m = 0$, then the value of k when $x = 2$ and $m = 3$ is _____

OR

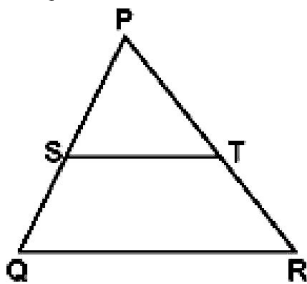
The value of k so that the following system of equations has no solution is _____
 $3x - y - 5 = 0$, $6x - 2y + k = 0$

16. If the circumference is numerically equal to 3 times the area of a circle, then find the radius of the circle.
17. Five cards—the ten, jack, queen, king and ace of diamonds, are well-shuffled with their face downwards. One card is then picked up at random. What is the probability that the card is the queen?
18. How many multiples of 4 lie between 10 and 250?
19. In right triangle ABC, $\angle B = 90^\circ$, $AB = 3\text{cm}$ and $AC = 6\text{cm}$. Find $\angle C$ and $\angle A$.

OR

If $\sin \theta = x$ and $\sec \theta = y$, then find the value of $\cot \theta$.

20. In figure, S and T are points on the sides PQ and PR, respectively of ΔPQR , such that $PT = 2$ cm, $TR = 4$ cm and ST is parallel to QR. Find the ratio of the areas of ΔPST and ΔPQR .



SECTION – B

Questions 21 to 26 carry 2 marks each.

21. Cards numbered 1 to 30 are put in a bag. A card is drawn at random from this bag. Find the probability that the number on the drawn card is not divisible by 3.
22. The wheels of a car are of diameter 80 cm each. How many complete revolutions does each wheel make in 10 minutes when the car is travelling at a speed of 66 km per hour?

23. In a single throw of two dice, find the probability of getting a total of 9 or 11

OR

A child's game has 8 triangles of which 3 are blue and rest are red, and 10 squares of which 6 are blue and rest are red. One piece is lost at random. Find the probability that it is a triangle of red colour

24. Evaluate: $\frac{\cos 45^\circ}{\sec 30^\circ + \operatorname{cosec} 30^\circ}$

OR

If A, B and C are interior angles of a triangle ABC, then show that $\tan\left(\frac{A+C}{2}\right) = \cot\frac{B}{2}$.

25. Divide $3x^2 - x^3 - 3x + 5$ by $x - 1 - x^2$.

26. Prove that the tangents drawn at the ends of a diameter of a circle are parallel.

SECTION – C

Questions 27 to 34 carry 3 marks each.

27. Prove that $3\sqrt{2} - 5$ is an irrational number.

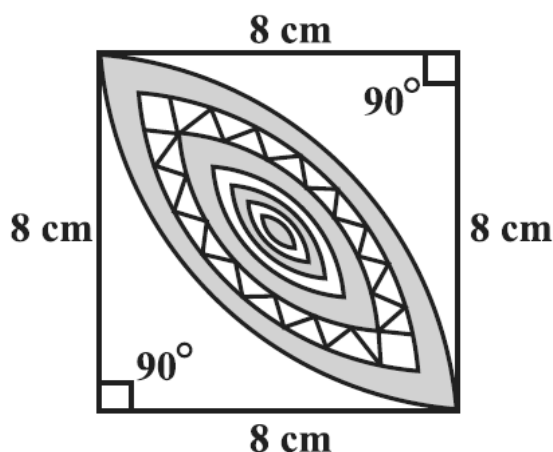
OR

On a morning walk three persons step off together and their steps measure 40 cm, 42 cm, 45 cm, what is the minimum distance each should walk so that each can cover the same distance in complete steps?

28. Find the zeroes of the quadratic polynomial $2x^2 - 5x + 3 = 0$, and verify the relationship between the zeroes and the coefficients.

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

30. Calculate the area of the designed region in below figure common between the two quadrants of circles of radius 8 cm each.



31. In ΔPQR , right-angled at Q, $PR + QR = 25$ cm and $PQ = 5$ cm. Determine the values of $\sin P$, $\cos P$ and $\tan P$.

OR

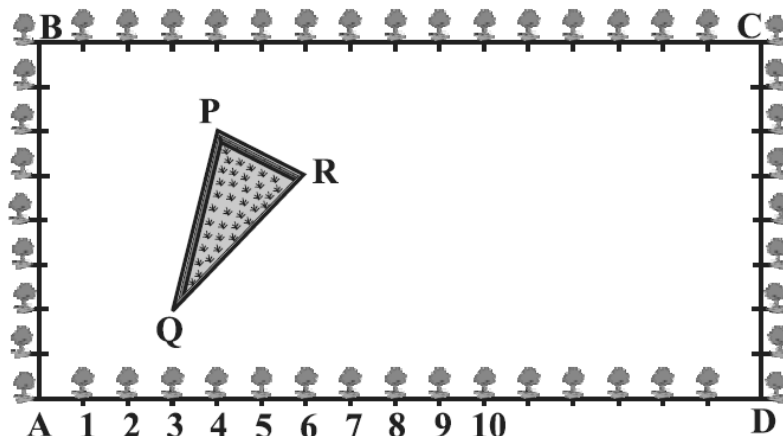
Express the ratios $\cos A$, $\tan A$ and $\sec A$ in terms of $\cos A$.

32. 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

Draw a line segment of length 12 cm and divide it in the ratio 7 : 5. Measure the two parts.

33. Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that $\angle PTQ = 2 \angle OPQ$.
34. The Class X students of a secondary school in Krishinagar have been allotted a rectangular plot of land for their gardening activity. Sapling of Gulmohar are planted on the boundary at a distance of 1m from each other. There is a triangular grassy lawn in the plot as shown in the below figure. The students are to sow seeds of flowering plants on the remaining area of the plot. Taking A as origin, find the area of the triangle PQR



SECTION – D

Questions 35 to 40 carry 4 marks each.

35. The angles of depression of the top and the bottom of an 8 m tall building from the top of a multi-storeyed building are 30° and 45° , respectively. Find the height of the multi-storeyed building and the distance between the two buildings.
36. A pole has to be erected at a point on the boundary of a circular park of diameter 13 metres 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. Is it possible to do so? If yes, at what distances from the two gates should the pole be erected?
37. If the sum of first 4 terms of an AP is 40 and that of first 14 terms is 280, find the sum of its first n terms.

OR

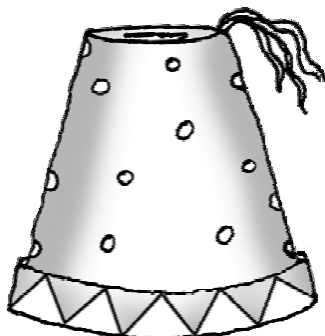
How many terms of the AP : 24, 21, 18, . . . must be taken so that their sum is 78?

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

OR

State and prove Basic proportionality theorem.

39. A fez, the cap used by the Turks, is shaped like the frustum of a cone (see below figure). If its radius on the open side is 10 cm, radius at the upper base is 4 cm and its slant height is 15 cm, find the area of material used for making it.



OR

A farmer connects a pipe of internal diameter 20 cm from a canal into a cylindrical tank in her field, which is 10 m in diameter and 2 m deep. If water flows through the pipe at the rate of 3 km/h, in how much time will the tank be filled?

40. 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