

KENDRIYA VIDYALAYA GACHIBOWLI, GPRA CAMPUS, HYD-32
SAMPLE PAPER 08 (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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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. If $x = 2^3 \times 3 \times 5^2$ and $y = 2^2 \times 3^3$, then HCF of x and y is
(a) 12 (b) 108 (c) 6 (d) 36
2. The largest number which divides 70 and 125 leaves remainders 5 and 8 respectively is
(a) 12 (b) 13 (c) 5 (d) none of these
3. If A(5, 1), B(1, 5) and C(-3, -1) are the vertices of ΔABC then the length of median AD is
(a) 6 (b) $\sqrt{37}$ (c) 7 (d) $\sqrt{42}$
4. If the distance between the points (4, k) and (1, 0) is 5, then the values of k is
(a) ± 3 (b) ± 4 (c) ± 5 (d) ± 6
5. If $(3, \frac{3}{4})$ is the midpoint of the line segment joining the points (k, 0) and $(7, \frac{3}{2})$, then the value of k is
(a) $k = 1$ (b) $k = 3$ (c) $k = -1$ (d) none of these
6. For what value of k, does the pair of linear equations given below has a unique solution?
 $y - x = 6$ and $3kx + 2y = 7$
(a) $k \neq \frac{-3}{2}$ (b) $k \neq 3$ (c) $k \neq \frac{-2}{3}$ (d) none of these
7. If $x \cdot \tan 45^\circ \cdot \cot 60^\circ = \sin 30^\circ \cdot \operatorname{cosec} 60^\circ$, then the value of x is
(a) 1 (b) $\frac{1}{4}$ (c) $\frac{1}{2}$ (d) $\sqrt{3}$
8. If $\sin(A - B) = 1$ and $\cos(A + B) = 1$, then the value of A and B, respectively are
(a) 45° and 15° (b) 30° and 15° (c) 45° and 30° (d) none of these
9. If ΔABC is right angled at B, then the value of $\cos(A + C)$ is
(a) 0 (b) 1 (c) $\frac{1}{2}$ (d) n.d.

10. Consider the following frequency distribution:

Class	0-9	10-19	20-29	30-39	40-49
Frequency	13	10	15	8	11

The upper limit of the median class is

- (a) 29 (b) 29.5 (c) 30 (d) 19.5

11. The discriminant of the quadratic equation: $3\sqrt{3}x^2 + 10x + \sqrt{3} = 0$ is _____

OR

If the two zeroes of the quadratic polynomial $7x^2 - 15x - k$ are reciprocals of each other, then the value of k is _____

12. A number is selected at random from the first 50 natural numbers then the probability that it is a multiple of 3 and 4 is _____

13. $\Delta ABC \sim \Delta DEF$ and their areas be, respectively, 64 cm^2 and 121 cm^2 . If $EF = 15.4 \text{ cm}$ then the value of BC is _____

14. If the sum of first m terms of an AP is $2m^2 + 3m$, then its second term is _____

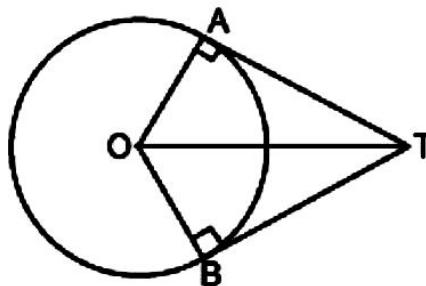
15. A cylinder and a cone are of same base radius and of same height then the ratio of the volume of cylinder to that of the cone is _____

16. Find the 25th term of the A.P. $-5, -\frac{5}{2}, 0, \frac{5}{2}, \dots$

17. From a point P, the length of the tangent to a circle is 15 cm and distance of P from the centre of the circle is 17 cm. Then what is the radius of the circle?

OR

In figure if $\angle ATO = 40^\circ$, find $\angle AOB$.



18. Find the values of k for which the quadratic equation $(k + 4)x^2 + (k + 1)x + 1 = 0$ has equal roots.

19. The HCF of two numbers is 145 and their LCM is 2175. If one number is 725, then find the other number.

20. The perimeter of two similar triangles ABC and LMN are 60 cm and 48 cm respectively. If LM = 8 cm, then what is the length of AB ?

SECTION – B

Questions 21 to 26 carry 2 marks each.

21. 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

OR

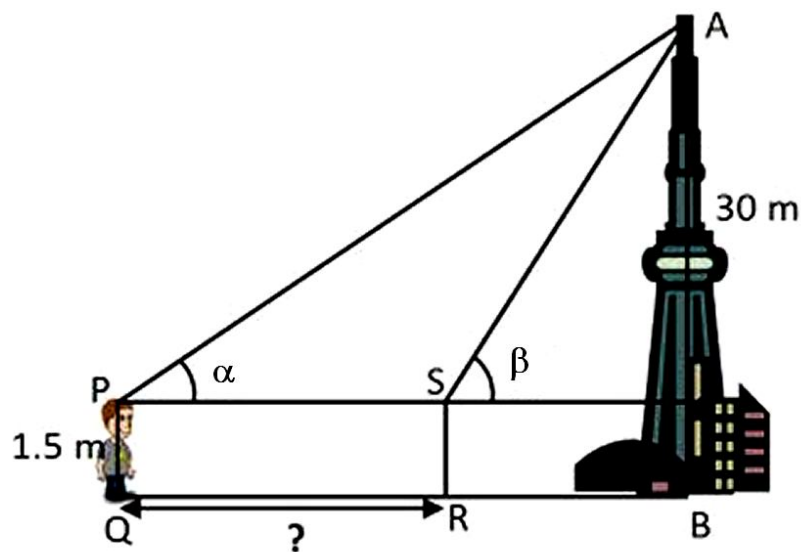
A bag contains 18 balls out of which x balls are red. (i) If one ball is drawn at random from the bag, what is the probability that it is not red? (ii) If 2 more red balls are put in the bag, the probability of drawing a red ball will be times the probability of drawing a red ball in the first case. Find the value of x .

22. 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.

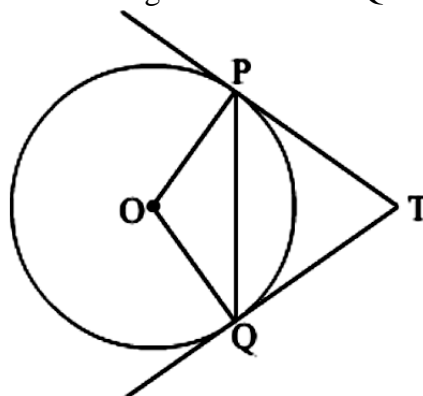
OR

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

23. A Minar is a tower or turret found especially in India. It is the famous monument of tourist attractions including other places near it. From ancient time, it is believed that one who encircle it with hands by standing in front of it with his back, would get his all wishes fulfilled. Tourists from all over the world come here every year to see the beauty of this historical and unique monument. One day a 1.5 m tall boy went for an excursion trip. He saw a beautiful minar and he asked about the height of the minar from the local guide. The local guide told him that the height of the minar is 30 m approximately. He is standing at some distance from that minar and observes the angle of elevation from his eyes to the top of the building increases from α to β as he walks towards the building such that $\sin(\alpha + \beta) = 1$ and $\cos(\beta - \alpha) = \frac{\sqrt{3}}{2}$. Find the distance he walked towards the building.



24. 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.



25. Prashant has undertaken a contract to build a wall of 9m long, 2.5m thick and 6m high. His labour is to be calculated according to the number of bricks used to complete the wall. In the market three types of bricks are available.
 Type-I : Each measuring $25\text{cm} \times 11.25\text{cm} \times 6\text{cm}$
 Type-II : Each measuring $20\text{cm} \times 8\text{cm} \times 10\text{cm}$
 Type-III : Each measuring $25\text{cm} \times 10\text{cm} \times 9\text{cm}$
 Prashant used bricks of type-III.
 (a) Find the number of bricks of type-III required to build the wall.
 (b) In which case, maximum number of bricks will be used?
26. Find the sum of the first 25 terms of an AP whose nth term is given by $a_n = 7 - 3n$.

SECTION – C

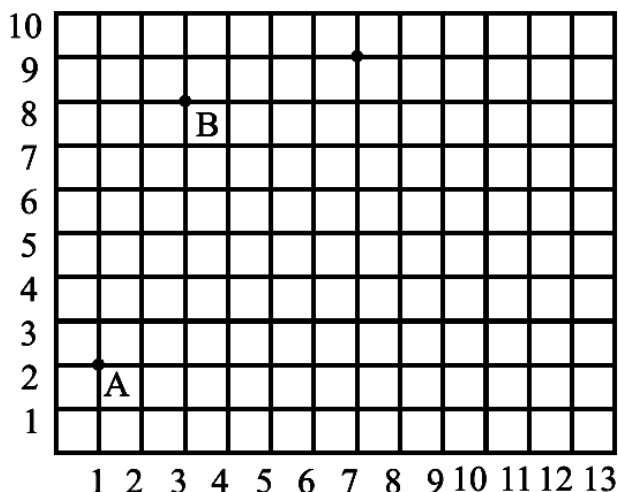
Questions 27 to 34 carry 3 marks each.

27. Show that any positive odd integer is of the form $6q + 1$ or $6q + 3$ or $6q + 5$ where $q \in \mathbb{Z}$.

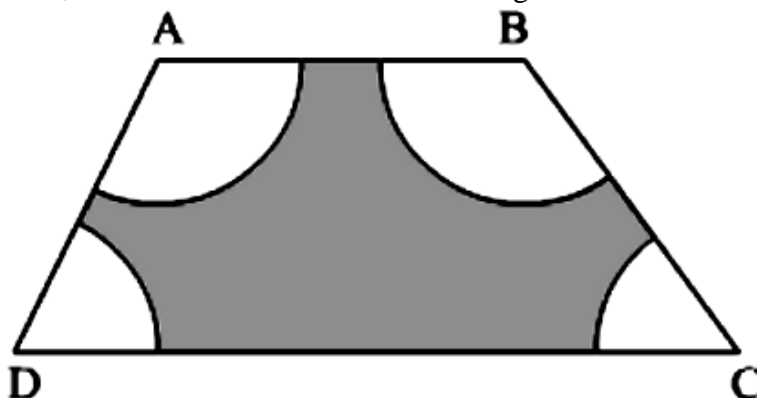
OR

If the HCF of 408 and 1032 is expressible in the form of $1032m + 408n$, find m and n.

28. One day, three friends Aakash, Aditya and Manoj went to Children Park to play some games. While playing at one moment Aakash is at the point P, Aditya is at point A and Manoj is at point at B such that Aakash's distance from Aditya and Manoj are equal. If the position of Aditya and Manoj are given as (1, 2) and (3, 8) respectively and area of $\Delta PAB = 10$ sq. m, then find the coordinates of P. Also find the distance of Aakash from Aditya and Manoj.



29. 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.

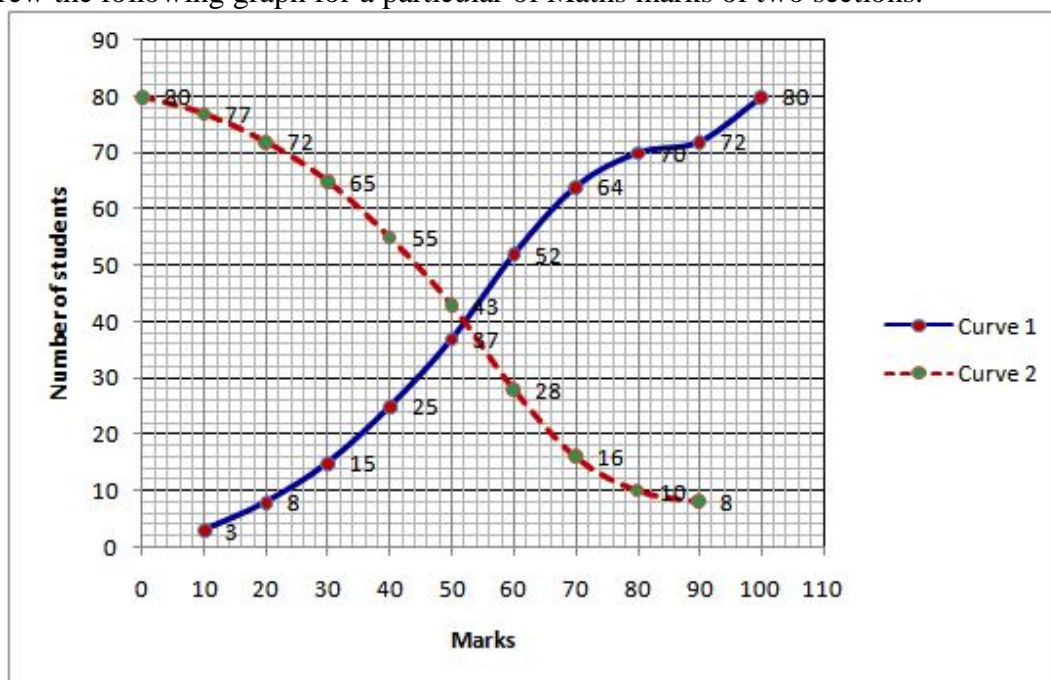


30. Ritu can row downstream 20 km in 2 hours, and upstream 4 km in 2 hours. Find her speed of rowing in still water and the speed of the current.

OR

Solve the following system of equations: $152x - 378y = -74$ and $-378x + 152y = -604$

31. Find the zeroes of the quadratic polynomial $6x^2 - 7x - 3$ and verify the relationship between the zeroes and the coefficients.
32. 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.
33. Mohan decided to complete his Maths project. He was collected the marks in Maths from two sections. The total number of students in two sections is 80. After collecting the data, he analyzed the data and prepared a report on the Maths marks of two sections. Using this report, he drew the following graph for a particular of Maths marks of two sections:



Based on the above graph, answer the following questions:

- (i) Identify less than type ogive and more than type ogive from the given graph.
(ii) Find the median marks of two sections.
(iii) Obtain the Mode of the data if mean rainfall is 52 cm

34. 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

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

SECTION – D

Questions 35 to 40 carry 4 marks each.

35. At a point A, 20 metres above the level of water in a lake, the angle of elevation of a cloud is 30° . The angle of depression of the reflection of the cloud in the lake, at A is 60° . Find the distance of the cloud from A.

36. 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.

OR

Draw a triangle ABC with side BC = 6 cm, AB = 5 cm and $\angle ABC = 60^\circ$. Then construct a triangle whose sides are $\frac{7}{4}$ of the corresponding sides of the triangle ABC.

37. 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 $\pi = \frac{22}{7}$)

38. 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.

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. 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