

**KENDRIYA VIDYALAYA GACHIBOWLI , GPRA CAMPUS, HYD-32**  
**SAMPLE PAPER 02 (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
Algebra	Real Numbers	2(2)	--	1(1)	--	3(1)*	--	6(3)	6(3)
	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)	
Coordinate Geometry	Arithmetic progression	--	1(1)	1(1)	2(1)	3(1)	--	7(5)	
	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)	
	<b>Total</b>	<b>10(10)</b>	<b>5(5)</b>	<b>5(5)</b>	<b>12(6)</b>	<b>24(8)</b>	<b>24(6)</b>	<b>80(30)</b>	<b>80(40)</b>

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

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**SAMPLE PAPER 02 (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 decimal representation of  $\frac{71}{150}$  is
  - (a) a terminating decimal
  - (b) a non-terminating, repeating decimal
  - (c) a non-terminating and non-repeating decimal
  - (d) none of these
2. If HCF and LCM of two numbers are 4 and 9696, then the product of the two numbers is:
  - (a) 9696
  - (b) 24242
  - (c) 38784
  - (d) 4848
3. The sum of the digits of a two digit number is 9. If 27 is added to it, the digits of the numbers get reversed. The number is
  - (a) 36
  - (b) 72
  - (c) 63
  - (d) 25
4. The fourth vertex D of a parallelogram ABCD whose three vertices are A (-2, 3), B (6, 7) and C (8, 3) is
  - (a) (0, 1)
  - (b) (0, -1)
  - (c) (-1, 0)
  - (d) (1, 0)
5. If the point P (2, 1) lies on the line segment joining points A (4, 2) and B (8, 4), then
  - (a)  $AP = \frac{1}{3}AB$
  - (b)  $AP = PB$
  - (c)  $PB = \frac{1}{3}AB$
  - (d)  $AP = \frac{1}{2}AB$
6. The distance of the point P (-6, 8) from the origin is
  - (a) 8
  - (b)  $2\sqrt{7}$
  - (c) 10
  - (d) 6
7. If  $\sin A + \sin^2 A = 1$ , then the value of the expression  $(\cos^2 A + \cos^4 A)$  is
  - (a) 1
  - (b)  $\frac{1}{2}$
  - (c) 2
  - (d) 3
8. Given that  $\sin \theta = \frac{a}{b}$ , then  $\cos \theta$  is equal to
  - (a)  $\frac{b}{\sqrt{b^2 - a^2}}$
  - (b)  $\frac{b}{a}$
  - (c)  $\frac{\sqrt{b^2 - a^2}}{b}$
  - (d)  $\frac{a}{\sqrt{b^2 - a^2}}$

9. Given that  $\sin\alpha = \frac{1}{2}$  and  $\cos\beta = \frac{1}{2}$ , then the value of  $(\alpha + \beta)$  is  
 (a)  $0^\circ$  (b)  $30^\circ$  (c)  $60^\circ$  (d)  $90^\circ$

10. For the following distribution :

Marks	Number of students
Below 10	3
Below 20	12
Below 30	27
Below 40	57
Below 50	75
Below 60	80

the modal class is

- (a) 10-20 (b) 20-30 (c) 30-40 (d) 50-60

11. Given that one of the zeroes of the cubic polynomial  $ax^3 + bx^2 + cx + d$  is zero, the product of the other two zeroes is \_\_\_\_\_

**OR**

If 2 is the root of the equation  $x^2 + bx + 12 = 0$  and the equation  $x^2 + bx + q = 0$  has equal roots then  $q =$  \_\_\_\_\_

12. The areas of two similar triangles are in the ratio 4 : 9. The corresponding sides of these triangles are in the ratio \_\_\_\_\_

13. The shape of a gilli, in the gilli-danda game (see below figure), is a combination of \_\_\_\_\_



14. In an AP if  $a = -7.2$ ,  $d = 3.6$ ,  $a_n = 7.2$ , then  $n$  is \_\_\_\_\_

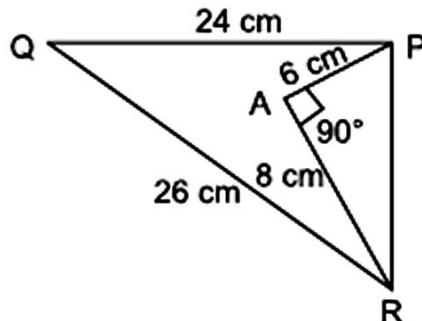
15. A card is selected at random from a well shuffled deck of 52 playing cards. The probability of its being a face card is \_\_\_\_\_

16. Two concentric circles are of radii 5 cm and 3 cm. Find the length of the chord of the larger circle which touches the smaller circle.

**OR**

If tangents PA and PB from a point P to a circle with centre O are inclined to each other at angle of  $80^\circ$ , then find  $\angle POA$ .

17. In the adjoining figure,  $PQ = 24$  cm,  $QR = 26$  cm,  $\angle PAR = 90^\circ$ ,  $PA = 6$  cm and  $AR = 8$  cm. Find  $\angle QPR$ .



18. If product of two numbers is 3691 and their LCM is 3691, find their HCF.

19. Find the value(s) of  $k$  for which the equation  $x^2 + 5kx + 16 = 0$  has real and equal roots.

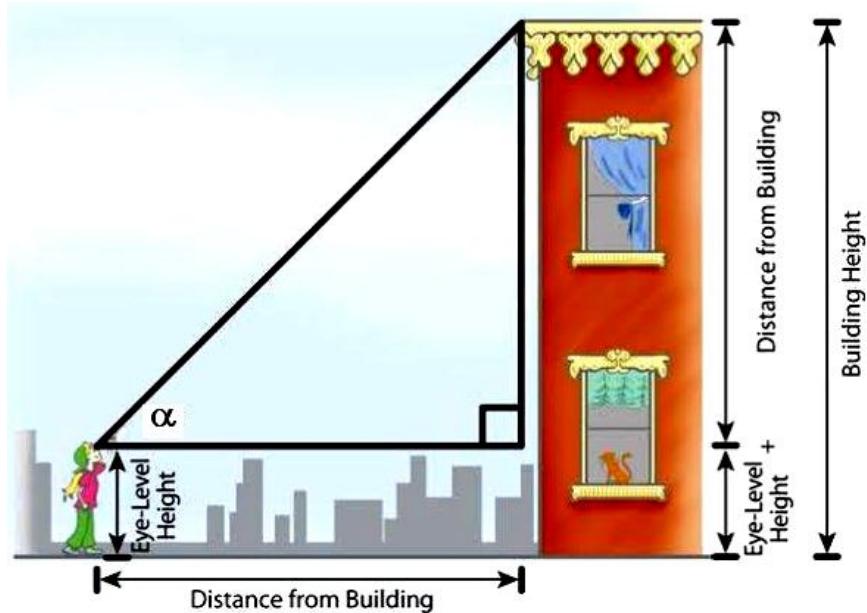
20. For what value of  $k$  will  $k + 9$ ,  $2k - 1$  and  $2k + 7$  are the consecutive terms of an A.P.?

## **SECTION – B**

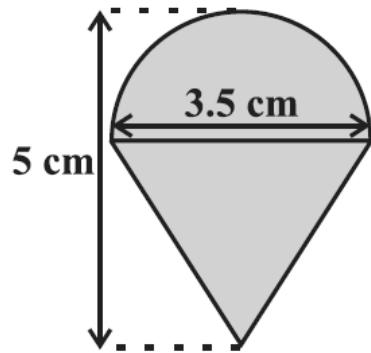
**Questions 21 to 26 carry 2 marks each.**

21. Apartment house, also called apartment block, or block of flats, building containing more than one dwelling unit, most of which are designed for domestic use, but sometimes including shops and other nonresidential features.

An educated farmer went to city along with his family members to see the tall apartment buildings. His daughter is watching one tall building. She was curious to find the height of the building. She asked her father to help her to find the height of the building. Her father told to calculate the distance from the building. She is 40 m away from the tall building. Also, she observes the angle of elevation of the top of the apartment buildings from her eyes is  $\alpha$  such that  $\operatorname{cosec} 5\alpha = \sec(135^\circ - 6\alpha)$ . What is the height of the apartment buildings if the height of the girl is 1 m?



22. A manufacturer involves 10 children in colouring playing tops (lattus), which are shaped like a cone surmounted by a hemisphere (see below figure). The entire top is 5 cm in height and the diameter of the top is 3.5 cm. Find the area they had to paint, if 50 playing tops were given to them

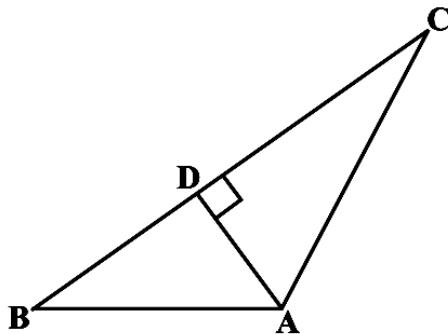


- 23.** Three different coins are tossed together. Find the probability of getting (i) exactly two heads  
(ii) at least two heads

**OR**

A card is drawn at random from a well-shuffled pack of 52 playing cards. Find the probability of getting (i) neither a red card nor a queen (ii) a face card or a spade card.

- 24.** In the below figure, if  $AD \perp BC$ , prove that  $AB^2 + CD^2 = BD^2 + AC^2$ .



**OR**

ABC is an isosceles triangle with  $AC = BC$ . If  $AB^2 = 2 AC^2$ , prove that ABC is a right triangle.

- 25.** Prove that the parallelogram circumscribing a circle is a rhombus.

- 26.** If the ratio of the sum of first  $n$  terms of two A.P's is  $(7n + 1) : (4n + 27)$ , find the ratio of their 10th terms.

### SECTION – C

**Questions 27 to 34 carry 3 marks each.**

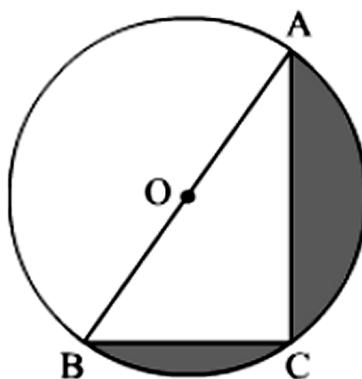
- 27.** In a morning walk, three persons step off together and their steps measure 40 cm, 42 cm and 45 cm, respectively. What is the minimum distance each should walk so that each can cover the same distance in complete steps?

**OR**

Use Euclid's Division Algorithm to find the HCF of 726 and 275.

- 28.** Obtain all the zeroes of  $3x^4 + 6x^3 - 2x^2 - 10x + 5$ , if two of its zeroes are  $\sqrt{\frac{5}{3}}$  and  $-\sqrt{\frac{5}{3}}$ .

- 29.** In the below figure, O is the centre of a circle such that diameter  $AB = 13$  cm and  $AC = 12$  cm. BC is joined. Find the area of the shaded region. (Take  $\pi = 3.14$ )



**30.** Four friends Aditi, Anita, Lavanya and Deepa were sitting in their classroom from the bottom as follows:

Aditi: Fourth row and fifth column

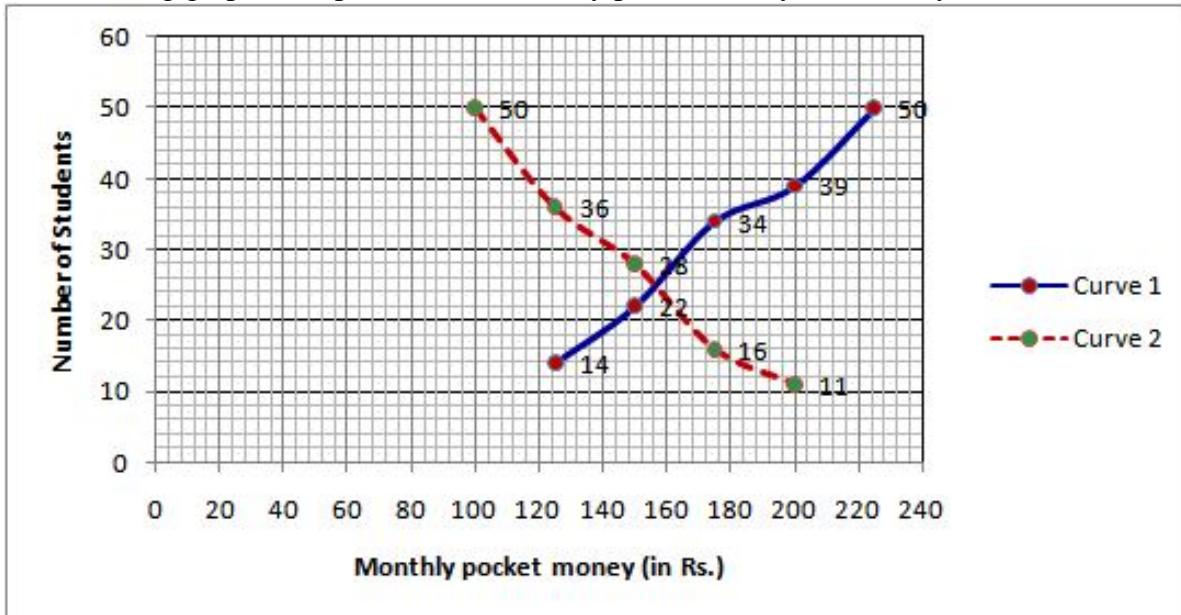
Anita: Seventh row and sixth column

Lavanya: Fourth row and third column

Deepa: First row and second column

Teacher asked Aditya, "Are they sitting in Rectangle?" Manoj took a ruler and tried to see whether they are sitting in Rectangle or not. He was not sure as the ruler was too short for this purpose. Aditi performed certain calculations and claimed that they are not sitting in Rectangle. State how did she arrive at this conclusion.

**31.** Mahesh collected the details of monthly pocket money received by students of his class. The total number of students is 50. After collecting the data, he analyzed the data and prepared a report on the monthly pocket money received by students of his class. Using this report, he drew the following graph for a particular of monthly pocket money received by students of his class:



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 monthly pocket money received by students.

(iii) Obtain the Mode of the data if mean monthly pocket money is 158

**32.** Places A and B are 100 km apart on a highway. One car starts from A and another from B at the same time. If the cars travel in the same direction at different speeds, they meet in 5 hours. If they travel towards each other, they meet in 1 hour. What are the speeds of the two cars?

**OR**

Solve the following system of equations:

$$\frac{5}{x-1} + \frac{1}{y-2} = 2 \text{ and } \frac{6}{x-1} - \frac{3}{y-2} = 1$$

**33.** If the sum of first m terms of an AP is the same as the sum of its first n terms, show that the sum of its first (m + n) terms is zero.

**34.** If  $\cos \theta + \sin \theta = \sqrt{2} \cos \theta$ , prove that  $\cos \theta - \sin \theta = \sqrt{2} \sin \theta$

**OR**

$$\text{Evaluate: } \frac{2 \sin 68^\circ}{\cos 22^\circ} - \frac{2 \cot 15^\circ}{5 \tan 75^\circ} - \frac{3 \tan 45^\circ \tan 20^\circ \tan 40^\circ \tan 50^\circ \tan 70^\circ}{5}$$

## **SECTION – D**

**Questions 35 to 40 carry 4 marks each.**

- 35.** Draw a right triangle in which the sides (other than hypotenuse) are of lengths 4 cm and 3 cm. Then construct another triangle whose sides are  $\frac{5}{3}$  times the corresponding sides of the given triangle.

**OR**

Draw a circle of radius 4 cm. Draw two tangents to the circle inclined at an angle of  $60^\circ$  to each other.

- 36.** The angle of elevation of a cloud from a point 60 m above the surface of the water of a lake is  $30^\circ$  and the angle of depression of its shadow from the same point in water of lake is  $60^\circ$ . Find the height of the cloud from the surface of water.

- 37.** A conical vessel, with base radius 5 cm and height 24 cm, is full of water. This water is emptied into a cylindrical vessel of base radius 10 cm. Find the height to which the water will rise in the cylindrical vessel. [Use  $\pi=22/7$ ]

**OR**

A sphere of diameter 12 cm, is dropped in a right circular cylindrical vessel, partly filled with water. If the sphere is completely submerged in water, the water level in the cylindrical vessel rises by  $3\frac{5}{9}$  cm. Find the diameter of the cylindrical vessel.

**38.** Solve for x :  $\frac{1}{(x-1)(x-2)} + \frac{1}{(x-2)(x-3)} = \frac{2}{3}, x \neq 1, 2, 3$

**OR**

Solve for x :  $\frac{1}{x+1} + \frac{2}{x+2} = \frac{4}{x+4}, x \neq -1, -2, -4$

- 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 50.

Class	0-20	20-40	40-60	60-80	80-100	Total
Frequency	17	$f_1$	32	$f_2$	19	120