KENDRIYA VIDYALAYA GACHIBOWLI, GPRA CAMPUS, HYD–32

SAMPLE PAPER 09 (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 09 (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. Which of the following has a terminating decimal expansion?

(a) $\frac{32}{91}$ (b) $\frac{19}{80}$ (c) $\frac{23}{45}$ (d) $\frac{25}{42}$

2. If $(m)^n = 32$ where m and n are positive integers, then the value of $(n)^{mn}$ is:

(a) 32 (b) 25 (c) 5^{10} (d) 5^{25}

3. If $3x + 2y = 13$ and $3x – 2y = 5$, then the value of $x + y$ is:

(a) 5 (b) 3 (c) 7 (d) none of these

4. If $\sin\theta – \cos\theta = 0$, then the value of $(\sin^4\theta + \cos^4\theta)$ is

(a) 1 (b) $\frac{3}{4}$ (c) $\frac{1}{2}$ (d) $\frac{1}{4}$

5. $\sin(45° + \theta) – \cos(45° – \theta)$ is equal to

(a) $2\cos\theta$ (b) 0 (c) $2\sin\theta$ (d) 1

6. If $4\tan\theta = 3$, then $\left(\frac{4\sin\theta – \cos\theta}{4\sin\theta + \cos\theta}\right)$ is equal to

(a) $\frac{2}{3}$ (b) $\frac{1}{3}$ (c) $\frac{1}{2}$ (d) $\frac{3}{4}$

7. AOBC is a rectangle whose three vertices are vertices A (0, 3), O (0, 0) and B (5, 0). The length of its diagonal is

(a) 5 (b) 3 (c) $\sqrt{34}$ (d) 4

8. The area of a triangle with vertices A (3, 0), B (7, 0) and C (8, 4) is

(a) 14 (b) 28 (c) 8 (d) 6

9. The point which lies on the perpendicular bisector of the line segment joining the points A (–2, –5) and B (2, 5) is

(a) (0, 0) (b) (0, 2) (c) (2, 0) (d) (–2, 0)

10. The median class from the following distribution is

Height(in cm)	160-162	163-165	166-168	169-171	172-174
No. of students	15	118	142	127	18

(a) 163 – 165 (b) 166 – 168 (c) 169 – 171 (d) none of these

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

OR

Write the nature of roots of the quadratic equation $9x^2 - 6x - 2 = 0$.

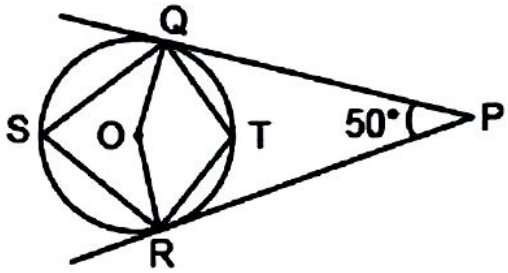
12. The lengths of the diagonals of a rhombus are 16 cm and 12 cm. Then, the length of the side of the rhombus is _____

13. A fair dice is rolled then the probability of getting number x such that $1 \leq x \leq 6$ is _____

14. The first four terms of an AP, whose first term is –2 and the common difference is –2, are _____

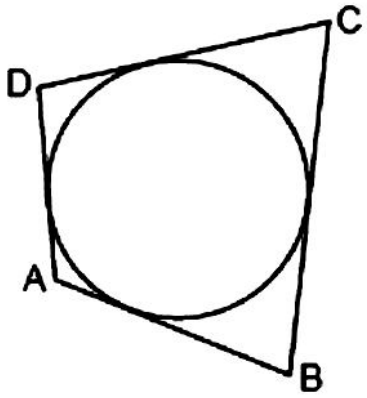
15. A cone of height 24 cm and radius of base 6 cm is made up of modelling clay, find volume of cone.

16. In the given figure, find QSR.



OR

In figure, a circle touches all the four sides of a quadrilateral ABCD whose sides are AB = 6 cm, BC = 9 cm and CD = 8 cm. Find the length of side AD.

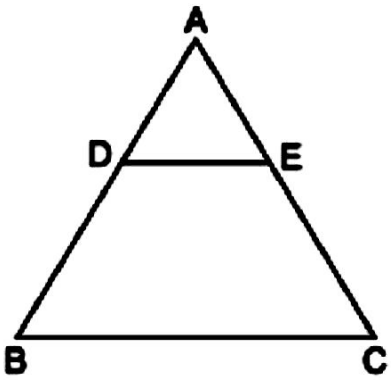


17. Check whether 6^n can end with the digit 0 for any natural number n.

18. If 2 is a root of the equation $x^2 + bx + 12 = 0$, find the value of b.

19. Find the 105^{th} term of the A.P. $4,\ 4\frac{1}{2},\ 5,\ 5\frac{1}{2},\ 6,\ldots\ldots$

20. In figure DE || BC. If BD = x – 3, AB = 2x. CE = x – 2 and AC = 2x + 3. Find x.



SECTION – B

Questions 21 to 26 carry 2 marks each.

21. 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.

OR

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.

22. 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 $(2m - 1) : (2n - 1)$.

23. A contractor is entrusted to erect a tent for flood-victims. He is allowed a fixed amount for this task. He has two options :

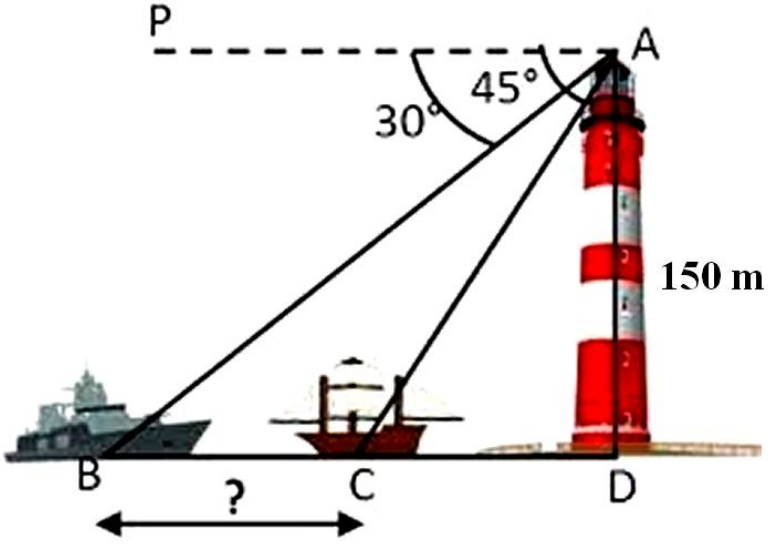
(i) to erect a tent which is cylindrical upto a height of 3 m and conical above it. The diameter of the base is 105 m and slant height of the conical part is 53 m.

(ii) to erect the tent as described in option(i), only replacing the conical part as a hemispherical part.

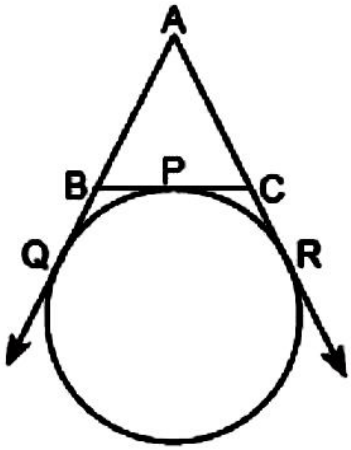
The contractor chooses the option-(ii) and decides to donate the extra (difference) canvas to be used in this case.

How much canvas is donated by the contractor?

24. As observed from the top of a 150 m high lighthouse from the sea-level, the angles of depression of two ships are 30° and 45°. If one ship is exactly behind the other on the same side of the lighthouse, find the distance between the two ships.



25. In figure, a circle touches the side BC of ΔABC at P and touches AB and AC produced at Q and R respectively. If AQ = 5 cm, find the perimeter of ΔABC.



26. In a ΔABC, AB = AC and D is a point on side AC, such that $BC^2 = AC \times CD$. Prove that BD = BC.

OR

In ΔABC, D and E are points on the sides AB and AC respectively, such that DE || BC. If AD = x, DB = x – 2, AE = x + 2 and EC = x – 1, Find the value of x.

SECTION – C

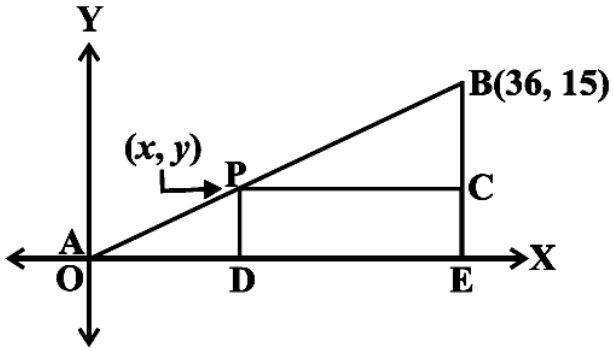
Questions 27 to 34 carry 3 marks each.

27. 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.

OR

By using Euclids algorithm find the largest number which divides 650 and 1170.

28. Suppose a telephone company wants to position a relay tower at P between A and B is such a way that the distance of the tower from B is twice its distance from A. If P lies on AB, it will divide AB in the ratio 1 : 2 (see the below figure). If we take A as the origin O, and 1 km as one unit on both the axis, the coordinates of B will be (36, 15). In order to know the position of the tower, we must know the coordinates of P. How do we find these coordinates?



29. 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.

OR

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

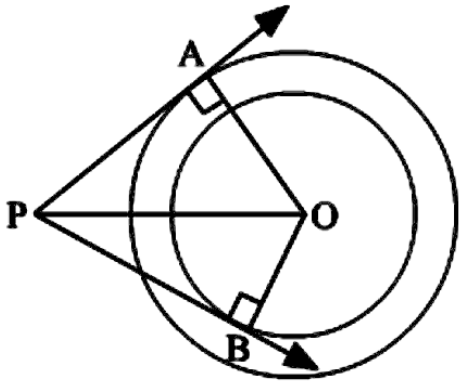
30. If the zeroes of the polynomial $2x^3 – 15x^2 + 37x – 30$ are a – b, a, a + b, find all the zeroes.

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

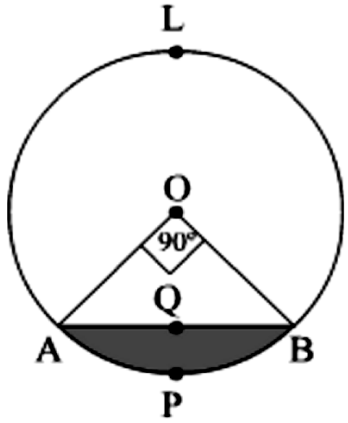
OR

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

32. 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.



33. 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 $\pi = 3.14$)



34. 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?

SECTION – D

Questions 35 to 40 carry 4 marks each.

35. 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 $\sqrt{3} = 1.732$)

36. Draw a line segment AB of length 8 cm. Taking A as centre, draw a circle of radius 4 cm and taking B as centre, draw another circle of radius 3 cm. Construct tangents to each circle from the centre of the other circle.

OR

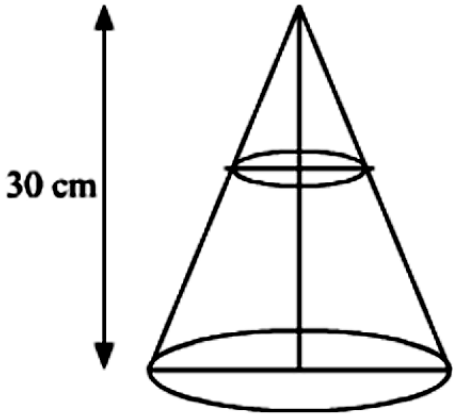
Draw a ΔABC in which AB = 4 cm, BC = 5 cm and AC = 6 cm. Then construct another triangle whose sides are $\frac{5}{3}$ of the corresponding sides of ΔABC.

37. 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.

38. 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 $\frac{1}{27}$ of the volume of cone, find at what height above the base is the section made.



OR

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.

39. 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.

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