24/01/2020

CODE-A

CLASS X (2019-20)
MATHEMATICS STANDARD(041)
SAMPLE PAPER-1

MM : 80

Time : 3 Hrs.

GENERAL INSTRUCTIONS :

(i) All questions are compulsory.

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

(iii) **Section A** comprises of **20 questions** (10 MCQ, 5 FITB and 5 VSA type) of **1 mark** each, **Section B** comprises of **6 questions** of **2 marks** each, **Section C** comprises of **8 questions** of **3 marks** each and **Section D** comprises of **6 questions** of **4 marks** each.

(iv) There is no overall choices in this paper. However, internal choice is provided in **2 questions** of **1 mark**, **2 questions** of **2 marks**, **3 questions** of **3 marks** and **3 questions** of **4 Marks**.

(v) Use of calculator is not permitted.

(vi) It is mandatory to use Blue/Black Ballpoint Pen to write the answer.

SECTION-A

Multiple Choice Type Questions : [10×1=10]

1. Mid-point of the line segment by joining the points $A(3, 2)$ and $B(5, 0)$ is [1]

   (1) (4, 2) (2) (8, 2)

   (3) (4, 1) (4) (1, 2)

2. HCF of 144, 63 and 36 is [1]

   (1) 18

   (2) 27

   (3) 54

   (4) 9

3. The polynomial whose zeroes are 2 and 3 is

(1) $K(x^2 + 5x + 6)$ (2) $K(x^2 - 5x + 6)$

(3) $K(x^2 - 5x - 6)$ (4) $K(x^2 - 6x + 5)$

4. When two dice are thrown, then the probability of getting the sum of two digits on the top of the dice as 8 is [1]

(1) $\frac{1}{6}$

(2) $\frac{5}{36}$

(3) $\frac{1}{9}$

(4) $\frac{31}{36}$

5. If $\sec\alpha - \text{cosec}9\alpha = 0$, then the value of $\sin 10\alpha$ is [1]

(1) $\cos 10\alpha$ (2) 0

(3) 1 (4) $\frac{1}{2}$

6. Consider the following distribution. [1]

Class	0 – 5	5 – 10	10 – 15	15 – 20	20 – 25
Frequency	5	10	7	12	18

The lower limit of the median-class is

(1) 20

(2) 15

(3) 10

(4) 25

7. If 60° is the angle of a sector of a circle $(O, 2r)$, then the area of the sector is [1]

(1) $\frac{\pi r^2}{6}$

(2) $\frac{2}{3}\pi r^2$

(3) $\frac{4\pi r^2}{3}$

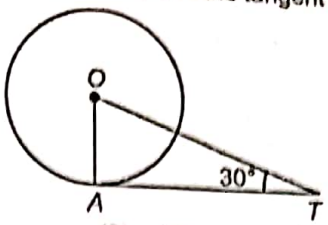
(4) $\frac{\pi r^2}{3}$

8. $\Delta PQR \sim \Delta BAC$, then $\frac{\text{ar}(PRQ)}{\text{ar}(BCA)}$ equals [1]

(1) $\frac{PQ}{BA}$ (2) $\frac{PQ^2}{AC^2}$

(3) $\frac{BC^2}{PR^2}$ (4) $\frac{QR^2}{AC^2}$

9. In the given figure, O is the centre of the circle and AT is the tangent at A. Then the measure of $\angle AOT$ is [1]



(1) 75°
(2) 45°
(3) 60°
(4) 30°

10. Which of the following equations has no real root? [1]

(1) $x^2 + 2x + 1 = 0$
(2) $3x^2 - 7x - 2 = 0$
(3) $5x^2 - 9x + 11 = 0$
(4) $5x + x^2 - 2 = 0$

Fill in the Blank Type Questions : [5×1=5]

11. The perimeter of a triangle with vertices (0, 5), (0, 0) and (–12, 0) is _____ units. [1]
12. The value of $\tan\theta$ _____ as θ increases in 1st quadrant. [1]

OR

$\sec\theta$ $(0° \le \theta \le 90°)$ is not defined at angle _____ . [1]

13. The probability of a certain event is _____. [1]
14. The median of first five prime numbers is _____. [1]
15. If p, q and r are in A.P., then q is called the _____ of p and r. [1]

Very Short Answer Type Questions : [5×1=5]

16. For what value of k, do the equations $3x - y + 8 = 0$ and $6x - ky = -16$ represent coincident lines? [1]

OR

Find the point of intersection of two lines $x - 3y = 2$ and $2x - y = 4$.

17. If the points $A(1, 3)$, $B(0, 1)$ and $C(1, b)$ are collinear. Find the value of b. [1]
18. A coin is tossed 3 times. Find the probability of getting atmost 2 heads. [1]
19. Find the mean of the following distribution. [1]

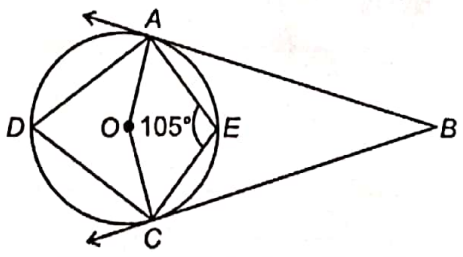
Class	1 – 5	5 – 9	9 – 13	13 – 17	17 – 21
Frequency					

20. A pole 16 m high casts a shadow $\sqrt{768}$ m long on the field. Find the Sun's elevation. [1]

SECTION-B

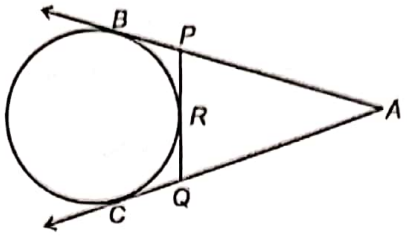
Short Answer Type Questions : [6×2=12]

21. If α and β are zeroes of the polynomial $3x^2 - x - 4$, then find the value of $\alpha^2 + \beta^2$. [2]
22. In the given figure, AB and BC are the tangents at A and C respectively to the circle with centre O. Find $\angle ABC$. [2]



OR

In the given figure, AB and AC are two tangents at B and C respectively to the circle. PQ is also a tangent at R
Prove that perimeter of ΔAPQ is twice of AB.

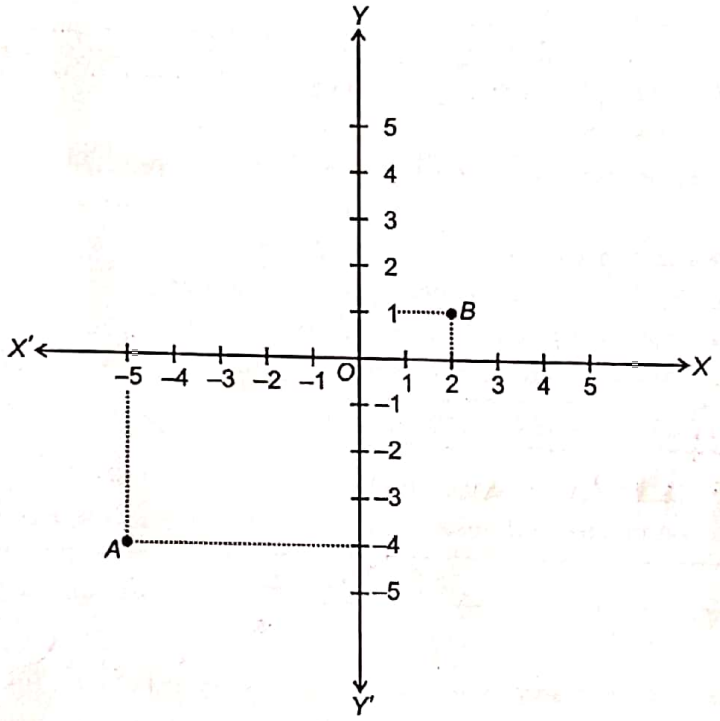


23. If $\cos x + \cos^2 x - 1 = 0$ then find the value of $\sin^2 x + \sin^4 x$. **[2]**

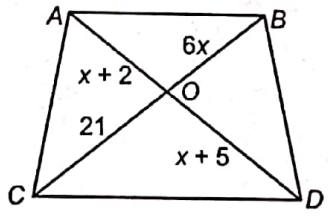
OR

Find the square root of $\frac{1-2\sin^2\theta}{2\cos^2\theta-1}$

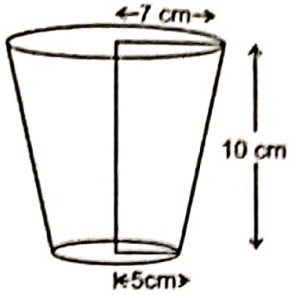
24. Anisha is standing on A and Mini is Standing on B. They want to meet each other so they decided to cover equal minimum distance and meet at point C. Find the coordinates of C. **[2]**



25. In the given trapezium $AB \parallel CD$. Find the value of x. **[2]**



26. Amyra bought 23.98 litre ice-cream to distribute it to all the children of her society. If she gives one ice-cream to each child in the following container in the shape of frustum then find number of children in her society. [2]



SECTION-C

Short Answer Type Questions : [8×3=24]

27. Find all zeroes of the polynomial $x^3 - 4x^2 - 5x + 14$ if two of its zeroes are $(3-\sqrt{2})$ and $(3+\sqrt{2})$. [3]

28. Draw the graphs of the equations $3x - y - 5 = 0$ and $7x - 2y - 28 = 0$. Also, determine the coordinates of the points where the lines intersect the X-axis. [3]

29. A circle touches all the four sides of a quadrilateral $ABCD$. Prove that $AB + CD = BC + DA$. [3]

OR

Prove that the length of the tangents drawn from an external point to a circle are equal.

30. Evaluate the following: [3]

$$\frac{\sin 30°}{\cos^2 45°} + \frac{\sec 70°}{3\,\text{cosec}\,20°} + \frac{4(\text{cosec}^2 43° - \tan^2 47°)}{3} - \frac{2\sec\theta \cdot \sin(90° - \theta)}{3}$$

31. Name the type of triangle formed by the points $P(3, 2)$, $Q(-1, -2)$, $R(7, -2)$. [3]

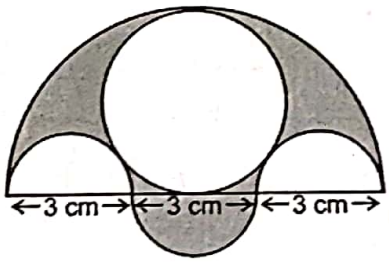
32. Construct a triangle ABC in which $BC = 8$ cm, $\angle B = 45°$ and $\angle C = 30°$. Construct another triangle similar to ΔABC such that its sides are $\frac{3}{4}$ of the corresponding sides of ΔABC. [3]

OR

Construct a tangent to a circle of radius 4 cm from a point on the concentric circle of radius 6 cm.

33. Prove that $\sqrt{7}$ is an irrational. [3]

34. Three semicircles each of diameter 3 cm, a circle of diameter 4.5 cm and a semicircle of radius 4.5 cm are drawn in the given figure. Find the area of the shaded region. [3]



OR

Find the area of the minor segment of a circle of radius 14 cm, when its central angle is 60°. Also find the area of the corresponding major segment. $\left[\text{Use } \pi = \frac{22}{7}\right]$

SECTION-D

Long Answer Type Questions : [6×4=24]

35. Solve for x : [4]

$$\frac{1}{x+1}+\frac{2}{x+2}=\frac{4}{x+4};\ x\neq -1,-2,-4$$

OR

Two taps running together can fill a tank in $3\frac{1}{13}$ hours. If one tap takes 3 hours more than the other to fill the tank, then how much time will each tap take to fill the tank?

36. In an A.P. 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. [4]

37. 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, from A is 60°. Find the distance of the cloud from A. [4]

OR

A man in a boat rowing away from a light house 100 m high takes 2 minutes to change the angle of elevation of the top of the light house from 60° to 30°. Find the speed of the boat in metres per minute. $\left[\text{Use } \sqrt{3}=1.732\right]$

38. Prove that the ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides. [4]

39. A juice seller serves his customers using a glass as shown in figure. The inner diameter of the cylindrical glass is 5 cm, but the bottom of the glass has a hemispherical portion raised which reduces the capacity of the glass. If the height of the glass is 10 cm, find the apparent capacity of the glass and its actual capacity. (Use $\pi = 3.14$) [4]

OR

Sushant has a vessel, of the form of an inverted cone, open at the top, of height 11 cm and radius of top as 2.5 cm and is full of water. Metallic spherical balls each of diameter 0.5 cm are put in the vessel due to which $\frac{2}{5}$th of the water in the vessel flows out. Find how many balls were put in the vessel.

40. If the median of the following frequency distribution is 32.5. Find the values of f_1 and f_2. [4]

Class	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70	Total
Frequency	f_1	5	9	12	f_2	3	2	40