



**SAMPLE PAPER 2 2024-25**

**Class 10 - Mathematics**

**Time Allowed: 3 hours**

**Maximum Marks: 80**

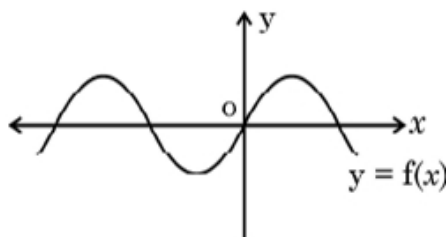
**General Instructions:**

Read the following instructions carefully and follow them:

1. This question paper contains 38 questions.
2. This Question Paper is divided into 5 Sections A, B, C, D and E.
3. In Section A, Questions no. 1-18 are multiple choice questions (MCQs) and questions no. 19 and 20 are Assertion-Reason based questions of 1 mark each.
4. In Section B, Questions no. 21-25 are very short answer (VSA) type questions, carrying 02 marks each.
5. In Section C, Questions no. 26-31 are short answer (SA) type questions, carrying 03 marks each.
6. In Section D, Questions no. 32-35 are long answer (LA) type questions, carrying 05 marks each.
7. In Section E, Questions no. 36-38 are case study-based questions carrying 4 marks each with sub-parts of the values of 1,1 and 2 marks each respectively.
8. All Questions are compulsory. However, an internal choice in 2 Questions of Section B, 2 Questions of Section C and 2 Questions of Section D has been provided. An internal choice has been provided in all the 2 marks questions of Section E.
9. Draw neat and clean figures wherever required.
10. Take  $\pi = 22/7$  wherever required if not stated.
11. Use of calculators is not allowed.

**Section A**

1. For what least value of  $n$  a natural number,  $(24)^n$  is divisible by 8? [1]
  - a) 1
  - b) 0
  - c) 2
  - d) No value of  $n$  is possible
2. The graph of  $y = f(x)$  is shown in the figure for some polynomial  $f(x)$ . The number of zeroes of  $f(x)$  are [1]



- a) 2
- b) 3
- c) 4
- d) 1



BC, CA, AB at D, E and F respectively, find BD.

a)  $b + s$  b)  $3b - s$

c)  $2s + b$  d)  $s - b$

11. If  $\sec \theta - \tan \theta = m$ , then the value of  $\sec \theta + \tan \theta$  is: [1]

a)  $\frac{1}{m}$  b)  $1 - \frac{1}{m}$

c)  $-m$  d)  $m^2 - 1$

12. If  $\cos A = \frac{5}{8}$ , then value of  $\cot A \cdot \sin A$  is: [1]

a)  $\frac{8}{5}$  b)  $\frac{5}{8}$

c)  $\frac{8}{\sqrt{39}}$  d)  $\frac{5}{\sqrt{39}}$

13. If a vertical pole of length 7.5 m casts a shadow 5 m long on the ground and at the same time, a tower casts a shadow 24 m long, then the height of the tower is: [1]

a) 36 m b) 20 m

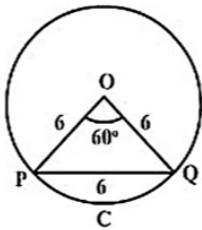
c) 40 m d) 60 m

14. What is the formula to calculate the area of a sector? [1]

a)  $\frac{x^\circ}{360^\circ} \times \pi r^2$  b)  $\frac{x^\circ}{360^\circ} \times \pi r^3$

c)  $\frac{x^\circ}{360^\circ} + \pi r^2$  d)  $\frac{x^\circ}{360^\circ} \times \pi r^2$

15. PQ is a chord of a circle with centre O and radius 6 cm. PQ is of length 6 cm and divides the circle into two segments. The area of the minor segment is [1]



a)  $(6\pi - 9\sqrt{3})\text{cm}^2$  b)  $(6\pi + \sqrt{3})\text{cm}^2$

c)  $(\pi - 3)\text{cm}^2$  d)  $\left(\frac{8\pi}{3} + \sqrt{3}\right)\text{cm}^2$

16. Two dice are thrown together. The probability of getting the difference of numbers on their upper faces equals to 3 is: [1]

a)  $\frac{1}{9}$  b)  $\frac{2}{9}$

c)  $\frac{1}{6}$  d)  $\frac{1}{12}$

17. An unbiased die is thrown once. The probability of getting a composite number is [1]

a)  $\frac{2}{5}$  b)  $\frac{1}{3}$

c)  $\frac{2}{3}$  d)  $\frac{1}{2}$

18. If the median of the data: 24, 25, 26,  $x + 2$ ,  $x + 3$ , 30, 31, 34 is 27.5, then  $x =$  [1]

a) 27 b) 28

c) 30 d) 25

19. **Assertion (A):** Two identical solid cubes of side 5 cm are joined end to end. The total surface area of the [1]

resulting cuboid is  $350 \text{ cm}^2$ .

**Reason (R):** Total surface area of a cuboid is  $2(lb + bh + hl)$

- a) Both A and R are true and R is the correct explanation of A.      b) Both A and R are true but R is not the correct explanation of A.  
 c) A is true but R is false.      d) A is false but R is true.

20. **Assertion (A):** Arithmetic mean between 8 and 12 is 10. [1]

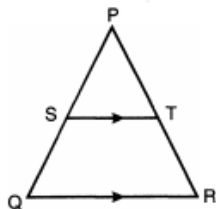
**Reason (R):** Arithmetic mean between two numbers a and b is given as  $\frac{a+b}{2}$ .

- a) Both A and R are true and R is the correct explanation of A.      b) Both A and R are true but R is not the correct explanation of A.  
 c) A is true but R is false.      d) A is false but R is true.

**Section B**

21. Prove that  $\sqrt{5}$  is an irrational number. [2]

22. In the given figure, in a triangle PQR,  $ST \parallel QR$  and  $\frac{PS}{SQ} = \frac{3}{5}$ ,  $PR = 28 \text{ cm}$ , find PT. [2]



23. Find the length of a chord which is at a distance of 12 cm from the centre of a circle of radius 13 cm. [2]

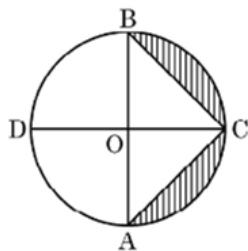
24. Prove the trigonometric identity: [2]

$$(\sec\theta + \cos\theta)(\sec\theta - \cos\theta) = \tan^2\theta + \sin^2\theta$$

OR

prove that  $(\sqrt{3} + 1)(3 - \cot 30^\circ) = \tan^3 60^\circ - 2\sin 60^\circ$

25. In the given figure, AB and CD are the diameters of a circle with centre O, perpendicular to each other. If  $OA = 7 \text{ cm}$ , find the area of the shaded region. [2]



OR

A chord 10 cm long is drawn in a circle whose radius is  $5\sqrt{2} \text{ cm}$ . Find the areas of both the segments. [Take  $\pi = 3.14$ .]

**Section C**

26. A wine seller had three types of wine. 403 liters of 1st kind, 434 liters of 2nd kind and 465 liters of 3rd kind. Find the least possible number of casks of equal size in which different types of wine can be filled without mixing. [3]

27. Find the zeroes of the polynomial  $y^2 + \frac{3}{2}\sqrt{5}y - 5$  by factorisation method and verify the relationship between the zeroes and coefficient of the polynomials. [3]

28. The coach of a cricket team buys 7 bats and 6 balls for ₹ 3800. later, she buys 3 bats and 5 balls for ₹ 1750. Find the cost of each bat and each ball by substitution method. [3]

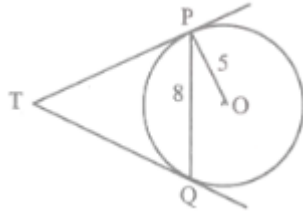
OR

The present age of a woman is 3 years more than three times the age of her daughter. Three years hence, the woman's age will be 10 years more than twice the age of her daughter. Find their present ages.

29. The two tangents from an external point P to a circle with centre O are PA and PB. If  $\angle APB = 70^\circ$ , what is the value of  $\angle AOB$ ? [3]

OR

In the given figure, PQ is a chord of length 8 cm of a circle of radius 5 cm and centre O. The tangents at P and Q intersect at point T. Find the length of TP.



30. If  $3 \tan \theta = 4$ , show that  $\frac{4 \cos \theta - \sin \theta}{2 \cos \theta + \sin \theta} = \frac{4}{5}$ . [3]
31. Data regarding the weights of students of Class X of a school is given below. [3]

Weight(in kg)	50 - 52	52 - 54	54 - 56	56 - 58	58 - 60	60 - 62	62 - 64
Number of students	18	21	17	28	16	35	15

Compute the mean weight of the students.

#### Section D

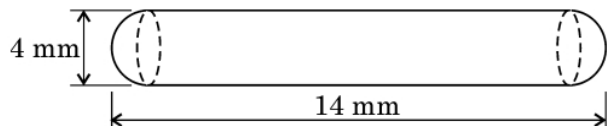
32. The sum of reciprocals of Roohi's age (in years) 3 years ago and 5 years hence from now is  $\frac{1}{3}$ . Find her present age. [5]

OR

A cottage industry produces a certain number of toys in a day. The cost of production of each toy (in rupees) was found to be 55 minus the number of toys produced in a day. On a particular day, the total cost of production was ₹ 750. We would like to find out the number of toys produced on that day. Represent the situations mathematically (quadratic equation).

33. If BD and QM are medians of triangles ABC and PQR, respectively, where  $\triangle ABC \sim \triangle PQR$ , prove that  $\frac{AB}{PQ} = \frac{BD}{QM}$ . [5]

34. A medicine capsule is in the shape of a cylinder with two hemispheres stuck to each of its ends. The length of the entire capsule is 14 mm and the diameter of the capsule is 4 mm, find its surface area. Also, find its volume. [5]



OR

A solid wooden toy is in the shape of a right circular cone mounted on a hemisphere. If the radius of the hemisphere is 4.2 cm and the total height of the toy is 10.2 cm, find the volume of that wooden toy.

35. Find the median wage from the following data: [5]

Wages(in Rs)	800 - 820	820 - 840	840 - 860	860 - 880	880 - 900	900 - 920	920 - 940
Number of workers	7	14	19	25	20	10	5

#### Section E

36. Read the following text carefully and answer the questions that follow: [4]

The students of a school decided to beautify the school on an annual day by fixing colourful flags on the straight passage of the school. They have 27 flags to be fixed at intervals of every 2 metre. The flags are stored at the position of the middlemost flag. Ruchi was given the responsibility of placing the flags. Ruchi kept her books where the flags were stored. She could carry only one flag at a time.



- i. How much distance did she cover in pacing 6 flags on either side of center point? (1)
- ii. Represent above information in Arithmetic progression. (1)
- iii. How much distance did she cover in completing this job and returning to collect her books? (2)

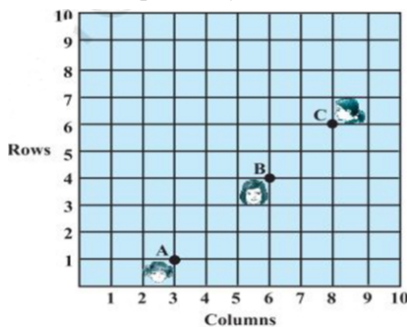
**OR**

What is the maximum distance she travelled carrying a flag? (2)

37. **Read the following text carefully and answer the questions that follow:**

[4]

There is a function in the school. Anishka, Bhawna and Charu are standing in a rectangular ground at points A, B and C respectively as shown in the figure. They are ready to perform an aerobic dance.



- i. How far is Charu from y-axis? (1)
- ii. Find distance between Anishka and Bhawna. (1)
- iii. Check whether  $AB + BC = AC$ ? (2)

**OR**

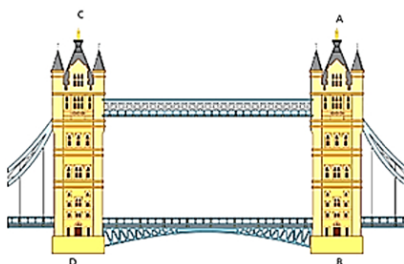
Is A, B and C lies in a straight line? (2)

38. **Read the following text carefully and answer the questions that follow:**

[4]

Tower Bridge is a Grade I listed combined bascule and suspension bridge in London, built between 1886 and 1894, designed by Horace Jones and engineered by John Wolfe Barry. The bridge is 800 feet (240 m) in length and consists of two bridge towers connected at the upper level by two horizontal walkways, and a central pair of bascules that can open to allow shipping.

In this bridge, two towers of equal heights are standing opposite each other on either side of the road, which is 80 m wide. During summer holidays, Neeta visited the tower bridge. She stood at some point on the road between these towers. From that point between the towers on the road, the angles of elevation of the top of the towers was  $60^\circ$  and  $30^\circ$  respectively.



- i. Find the distances of the point from the base of the towers where Neeta was standing while measuring the height. (1)
- ii. Neeta used some applications of trigonometry she learned in her class to find the height of the towers without actually measuring them. What would be the height of the towers she would have calculated? (1)
- iii. Find the distance between Neeta and top of tower AB? (2)

**OR**

Find the distance between Neeta and top tower CD? (2)

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