



SAMPLE PAPER 4 2024-25

Class 10 - Mathematics

Time Allowed: 3 hours

Maximum Marks: 80

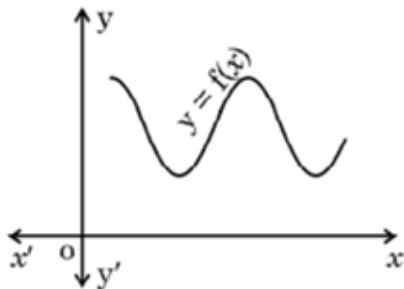
General Instructions:

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. LCM of $(2^3 \times 3 \times 5)$ and $(2^4 \times 5 \times 7)$ is [1]
 - a) 560
 - b) 1120
 - c) 1680
 - d) 40
2. The graph of $y = f(x)$ is shown in the figure for some polynomial $f(x)$. [1]



The number of zeroes of $f(x)$ is

a) 3

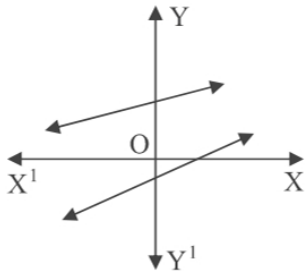
b) 4

c) 0

d) 2

3. In the given figure, graphs of two linear equations are shown. The pair of these linear equations is:

[1]



a) consistent with infinitely many solutions.

b) consistent with unique solution.

c) inconsistent but can be made consistent by extending these lines.

d) inconsistent.

4. If $y = 1$ is one of the solutions of the quadratic equation $py^2 + py + 3 = 0$, then the value of p is:

[1]

a) -3

b) 2

c) $-\frac{3}{2}$

d) -2

5. How many three-digit numbers are divisible by 9?

[1]

a) 100

b) 90

c) 96

d) 86

6. If $A(4, 9)$, $B(2, 3)$ and $C(6, 5)$ are the vertices of $\triangle ABC$, then the length of median through C is

[1]

a) 10 units

b) 5 units

c) $\sqrt{10}$ units

d) 25 units

7. The distance between the points $(2, -3)$ and $(-2, 3)$ is:

[1]

a) 10 units

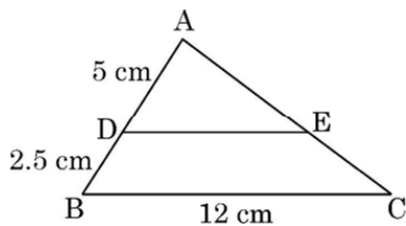
b) $2\sqrt{13}$ units

c) 5 units

d) $13\sqrt{2}$ units

8. In the given figure $\triangle ABC$ is shown. DE is parallel to BC . If $AD = 5$ cm, $DB = 2.5$ cm and $BC = 12$ cm, then DE is equal to

[1]



a) 10 cm

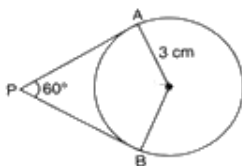
b) 7.5 cm

c) 6 cm

d) 8 cm

9. If two tangents inclined at 60° are drawn to circle of radius 3 cm, then length of each tangent is equal to

[1]



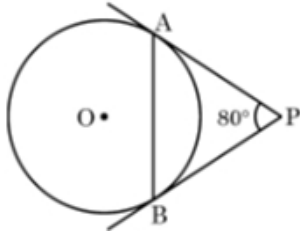
a) $3\sqrt{3}$

b) 3 cm

c) $2\sqrt{3}$ cm

d) $3\sqrt{2}$ cm

10. In the given figure, tangents PA and PB drawn from P to circle are inclined to each other at an angle of 80° . The measure of $\angle PAB$ is [1]



- a) 60° b) 50°
 c) 80° d) 40°

11. The value of $\frac{\sin 90^\circ + \cos 60^\circ}{\sec 45^\circ + \tan 45^\circ}$ is: [1]

- a) $\frac{3}{2}(\sqrt{2} - 1)$ b) $\frac{1+\sqrt{3}}{\sqrt{2}+1}$
 c) $\frac{3}{2}(\sqrt{2} + 1)$ d) 1

12. $\left(\frac{2}{3}\sin 0^\circ - \frac{4}{5}\cos 0^\circ\right)$ is equal to: [1]

- a) 45° b) 90°
 c) 30° d) 60°

13. If the height of a vertical pole is $\sqrt{3}$ times the length of its shadow on the ground, then the angle of elevation of the sun at that time is [1]

- a) 30° b) 75°
 c) 60° d) 45°

14. Area of a segment of a circle of radius r and central angle 90° is: [1]

- a) $\frac{2\pi r}{4} - \frac{1}{2}r^2$ b) $\frac{\pi r^2}{4} - \frac{1}{2}r^2$
 c) $\frac{\pi r^2}{2} - \frac{1}{2}r^2$ d) $\frac{2\pi r}{4} - r^2 \sin 90^\circ$

15. If AB is a chord of a circle of length $5\sqrt{3}$ cm with centre O and radius 5 cm, then area of sector OAB is [1]

- a) $\frac{25\pi}{3} \text{ cm}^2$ b) $25\pi \text{ cm}^2$
 c) $\frac{8\pi}{3} \text{ cm}^2$ d) $\frac{3\pi}{8} \text{ cm}^2$

16. A number is chosen from the numbers 1, 2, 3 and denoted as x, and a number is chosen from the numbers 1, 4, 9 and denoted as y. Then $P(xy < 9)$ is: [1]

- a) $\frac{7}{9}$ b) $\frac{5}{9}$
 c) $\frac{3}{9}$ d) $\frac{1}{9}$

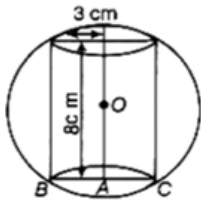
17. One card is drawn at random from a well-shuffled deck of 52 playing cards. What is the probability of getting a black king? [1]

- a) $\frac{1}{26}$ b) $\frac{1}{2}$
 c) $\frac{1}{52}$ d) $\frac{1}{13}$

18. If the value of each observation of a statistical data is increased by 3, then the mean of the data [1]

- a) remains unchanged
 b) increases by $3n$
 c) increase by 3
 d) increases by 6

19. **Assertion (A):** In the given figure, a sphere circumscribes a right cylinder whose height is 8 cm and radius of the base is 3 cm. The ratio of the surface area of the sphere and the cylinder is 6 : 11 [1]



Reason (R): Ratio of their surface area = $\frac{\text{Surface area of sphere}}{\text{Surface area of cylinder}}$

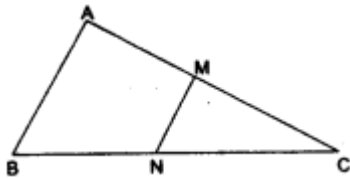
- a) Both A and R are true and R is the correct explanation of A.
 b) Both A and R are true but R is not the correct explanation of A.
 c) A is true but R is false.
 d) A is false but R is true.
20. **Assertion (A):** The 11th term of an AP is 7, 9, 11, 13 is 67. [1]

Reason (R): If s_n is the sum of first n terms of an AP then its n th term a_n is given by $a_n = s_n - s_{n-1}$.

- 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 $2 + 3\sqrt{3}$ is an irrational number. It is given that $\sqrt{3}$ is an irrational number. [2]
22. In the given figure, $MN \parallel AB$, $BC = 7.5$ cm, $AM = 4$ cm and $MC = 2$ cm. Find the length of BN . [2]



23. The distance between two tangents parallel to each other of a circle is 13 cm. Find the radius of the circle. [2]
24. Prove that $\frac{\cot A - \cos A}{\cot A + \cos A} = \sec^2 A + \tan^2 A - 2 \sec A \tan A$. [2]

OR

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

25. A chord of a circle of radius 10 cm subtends a right angle at the centre. Find the area of the minor segment. [Use $\pi = 3.14$.] [2]

OR

A chord of a circle of radius 10 cm subtends a right angle at the centre. Find the area of the corresponding:

- i. minor segment
 ii. major sector.

Section C

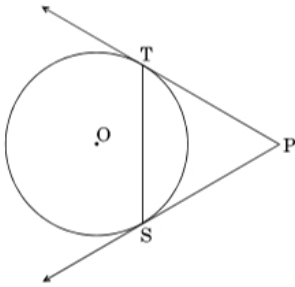
26. 144 cartons of Coke cans and 90 cartons of Pepsi cans are to be stacked in a canteen. If each stack is of the same height and if it equal contain cartons of the same drink, what would be the greatest number of cartons each stack would have? [3]
27. If α and β are zeroes of the quadratic polynomial $4x^2 + 4x + 1$, then form a quadratic polynomial whose zeroes are 2α and 2β . [3]

28. The ratio of the sums of first m and first n terms of an A.P. is $m^2 : n^2$. Show that the ratio of its m^{th} and n^{th} terms is $(2m - 1):(2n - 1)$. [3]

OR

Find the sum of all two-digit natural numbers which are divisible by 4.

29. In the given figure, PT and PS are tangents to a circle with centre O , from a point P , such that $PT = 4$ cm and $\angle TPS = 60^\circ$. Find the length of the chord TS . Also, find the radius of the circle. [3]



OR

Prove that the angle between the two tangents drawn from an external point to a circle is supplementary to the angle subtended by the line-segment joining the points of contact at the centre.

30. Evaluate : $\frac{\cos^2(45^\circ + \theta) + \cos^2(45^\circ - \theta)}{\tan(60^\circ + \theta) \tan(30^\circ - \theta)} + \operatorname{cosec}(75^\circ + \theta) - \sec(15^\circ - \theta)$. [3]

31. The mileage (km/l) of 50 cars was recorded by a dealer and tabulated as given below: [3]

Mileage (in km/l)	Number of Cars
10 - 12	13
12 - 14	18
14 - 16	10
16 - 18	7
18 - 20	2

Find mean of the above distribution.

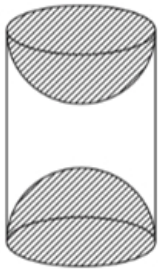
Section D

32. In a flight of 600 km, the speed of the aircraft was slowed down due to bad weather. The average speed of the trip was decreased by 200 km/hr and thus the time of flight increased by 30 minutes. Find the average speed of the aircraft originally. [5]

OR

If the difference between the radii of the smaller circle and the larger circle is 7 cm and the difference between the areas of the two circles is 1078 sq. cm. Find the radius of the smaller circle.

33. From the top of a hill, the angles of depression of two consecutive kilometre stones due east are found to be 45° and 30° respectively. Find the height of the hill. [5]
34. A wooden article was made by scooping out a hemisphere from each end of a solid cylinder. If the height of the cylinder is 15 cm and its base is of radius 4.2 cm, then find the total surface area of the article. [5]



OR

From a solid cylinder of height 20 cm and diameter 12 cm, a conical cavity of height 8 cm and radius 6 cm is hollowed out. Find the total surface area of the remaining solid.

35. Consider the following distribution of hourly wages of 50 workers of a factory: [5]

Hourly wages (in ₹)	100-120	120-140	140-160	160-180	180-200
Number of Workers	12	14	8	6	10

Find the mean and the median of the above data.

Section E

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

A coaching institute of Mathematics conducts classes in two batches I and II and fees for rich and poor children are different. In batch I, there are 20 poor and 5 rich children, whereas in batch II, there are 5 poor and 25 rich children. The total monthly collection of fees from batch I is ₹ 9000 and from batch II is ₹ 26,000. Assume that each poor child pays ₹ x per month and each rich child pays ₹ y per month.



- Represent the information given above in terms x and y . (1)
- Find the monthly fee paid by a poor child. (1)
- Find the difference in the monthly fee paid by a poor child and a rich child. (2)

OR

If there are 10 poor and 20 rich children in batch II, what is the total monthly collection of fees from batch II? (2)

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

Statue of a Pineapple: The Big Pineapple is a heritage-listed tourist attraction at Nambour Connection Road, Woombye, Sunshine Coast Region, Queensland, Australia. It was designed by Peddle Thorp and Harvey, Paul Luff, and Gary Smallcombe and Associates. It is also known as Sunshine Plantation. It was added to the Queensland Heritage Register on 6 March 2009.

Kavita last year visited Nambour and wanted to find the height of a statue of a pineapple. She measured the pineapple's shadow and her own shadow. Her height is 156 cm and casts a shadow of 39 cm. The length of

shadow of pineapple is 4 m.



- i. What is the height of the pineapple? (1)
- ii. What is the height Kavita in metres? (1)
- iii. Write the type of triangles used to solve this problem. (2)

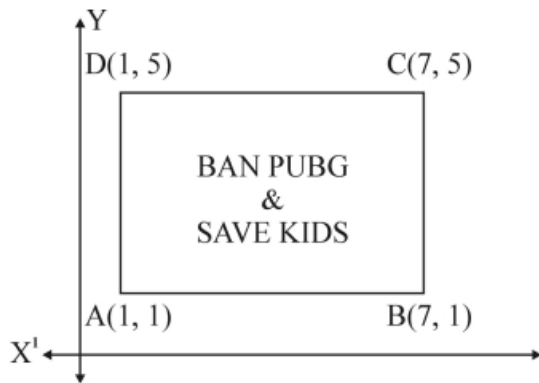
OR

Which similarity criterion of triangle is used? (2)

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

[4]

Use of mobile screen for long hours makes your eye sight weak and give you headaches. Children who are addicted to play “PUBG” can get easily stressed out. To raise social awareness about ill effects of playing PUBG, a school decided to start ‘BAN PUBG’ campaign, in which students are asked to prepare campaign board in the shape of a rectangle. One such campaign board made by class X student of the school is shown in the figure.



- i. Find the coordinates of the point of intersection of diagonals AC and BD. (1)
- ii. Find the length of the diagonal AC. (1)
- iii. Find the area of the campaign Board ABCD. (2)

OR

Find the ratio of the length of side AB to the length of the diagonal AC. (2)

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