S R Study Material

SAMPLE PAPER 5 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.

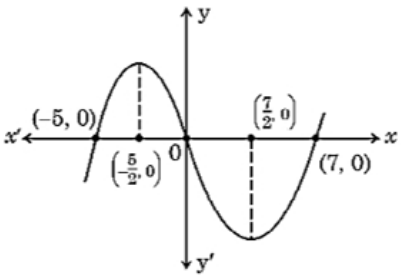
Section A

1. The HCF and the LCM of 12, 21, 15 respectively are: **[1]**

   a) 3, 140 b) 420, 3

   c) 12, 420 d) 3, 420

2. The graph of y = p(x) is given in the adjoining figure. Zeroes of the polynomial p(x) are **[1]**

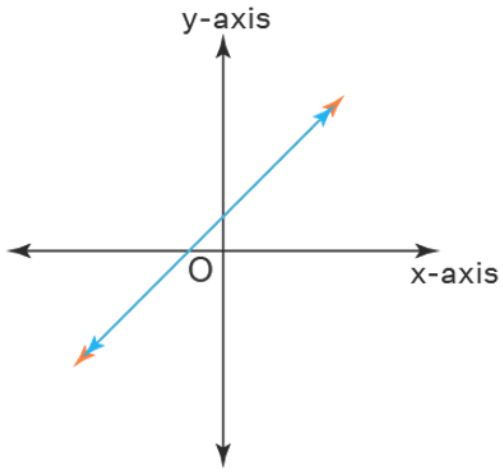


   a) $-5, \frac{-5}{2}, \frac{7}{2}, 7$ b) -5, 7

c) -5, 0, 7

d) $\frac{-5}{2}, \frac{-7}{2}$

3. A system of linear equations is said to be consistent, if it has **[1]**



a) two solutions

b) one or many solutions

c) no solution

d) exactly one solution

4. The value(s) of k for which the quadratic equation $3x^2$ - kx + 3 = 0 has equal roots, is (are) **[1]**

a) 9

b) -6

c) 6

d) ± 6

5. The sum of the first 50 odd natural numbers is: **[1]**

a) 2550

b) 2500

c) 5050

d) 5000

6. Distance of the point (6, 5) from the y-axis is **[1]**

a) 0 unit

b) 6 units

c) 5 units

d) $\sqrt{61}$ units

7. The point on x-axis which divides the line segment joining (2, 3) and (6, -9) in the ratio 1 : 3 is **[1]**

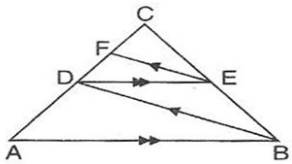
a) (6, 0)

b) (0, 3)

c) (3, 0)

d) (4, -3)

8. In the given figure, $AB||DE$ and $BD||EF$. Then, **[1]**



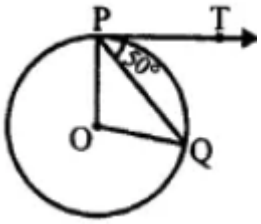
a) $BC^2 = AB.CE$

b) $DC^2 = CF \times AC$

c) $AB^2 = AC.DE$

d) $AC^2 = BC.DC$

9. In the given figure, O is the centre of a circle and PT is the tangent to the circle. If PQ is a chord such that $\angle QPT = 50°$, then $\angle POQ$ = ? **[1]**



a) 100° b) 90°

c) 75° d) 80°

10. A circle is of radius 3 cm. The distance between two of its parallel tangents is: **[1]**

a) 3 cm b) 4.5 cm

c) 6 cm d) 12 cm

11. If sec θ + tan θ = x, the value of sec θ is **[1]**

a) $\frac{1}{2}\left(x-\frac{1}{x}\right)$ b) $\frac{x^2-1}{x^2+1}$

c) $\frac{x^2+1}{x^2-1}$ d) $\frac{1}{2}\left(x+\frac{1}{x}\right)$

12. $\sin^2 A + \sin^2 A \tan^2 A$ = **[1]**

a) $\tan^2 A$ b) $\cos^2 A$

c) $\cot^2 A$ d) $\sin^2 A$

13. A boy is flying a kite, the string of the kite makes an angle of 30^o with the ground. If the height of the kite is 18 m, then the length of the string is **[1]**

a) 18 m b) 36 m

c) $18\sqrt{3}m$ d) $36\sqrt{3}m$

14. Find the area of a sector of a circle of radius 28 cm and central angle 45^o. **[1]**

a) 308 cm^2 b) 208 cm^2

c) 318 cm^2 d) 305 cm^2

15. A piece of wire 20cm long is bent into the form of an arc of a circle subtending an angle of 60^o at its centre. The radius of the circle is **[1]**

a) $\frac{20}{6+\pi}$ cm b) $\frac{30}{6+\pi}$ cm

c) $\frac{60}{\pi}$ cm d) $\frac{15}{6+\pi}$ cm

16. Two coins are tossed together. The probability of getting atmost two heads, is: **[1]**

a) 1 b) $\frac{3}{4}$

c) $\frac{1}{4}$ d) $\frac{1}{2}$

17. Which of the following cannot be the probability of an event? **[1]**

a) - 1.5 b) 0.7

c) $\frac{2}{3}$ d) 15%

18. If x_i is changed to x_i + a, then $\overline{x}$ is changed to **[1]**

a) $\overline{x}$ + a

b) a$\overline{x}$

c) $\overline{x}$ - a

d) $\frac{\overline{x}}{a}$

19. **Assertion (A):** Two identical solid cubes of side 5 cm are joined end to end. The total surface area of the resulting cuboid is 300 cm^2. **[1]**

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

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):** Sum of first hundred even natural numbers divisible by 5 is 500 **[1]**

Reason (R): Sum of first n-terms of an A.P. is given by $S_n = \frac{n}{2}[a + l]$ where l = last term.

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. Classify the following numbers as rational or irrational and give justification of your answer. **[2]**

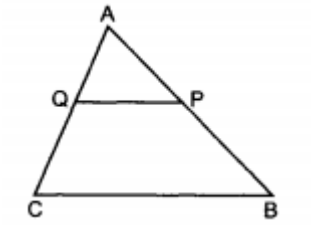
i. 0.05918

ii. 1.010010001...

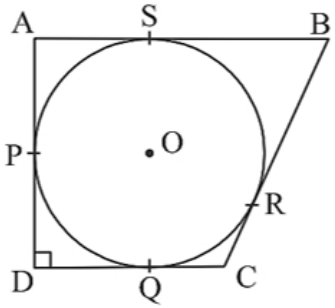
iii. $\sqrt{\frac{9}{27}}$

iv. $\sqrt{\frac{12}{75}}$

22. In the fig., P and Q are points on the sides AB and AC respectively of $\triangle$ABC such that AP = 3.5 cm, PB = 7 cm, AQ = 3 cm and QC = 6 cm. Find BC. **[2]**



23. A circle with centre O and radius 8 cm is inscribed in a quadrilateral ABCD in which P, Q, R, S are the points of contact as shown. If AD is perpendicular to DC, BC = 30 cm and BS = 24 cm, then find the length DC. **[2]**



24. Prove the trigonometric identity: $(1 + \tan\theta + \cot\theta)(\sin\theta - \cos\theta) = \left(\frac{\sec\theta}{cosec^2\theta} - \frac{cosec\theta}{\sec^2\theta}\right)$ **[2]**

OR

If A = 30° and B = 60°, verify that sin (A + B) = sin A cosB + cos A sinB

25. The length of the minute hand of a clock is 14 cm. Find the area swept by the minute hand between 8:00 am and 8:05 am. **[2]**

OR

Find the area of a quadrant of a circle , whose circumference is 22 cm .

Section C

26. In the Hospital The nurse is supposed to monitor a patient after 84min another at 90 min and the third one at 120 min. For this, she set up alarms accordingly. At what time will all her alarms ring at the same time? **[3]**

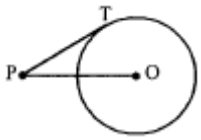
27. Find the zeroes of the polynomial $4x^2 + 5\sqrt{2}x - 3$ by factorisation method and verify the relationship between the zeroes and coefficient of the polynomial. **[3]**

28. On selling a TV at 5% gain and a fridge at 10% gain, a shopkeeper gains ₹3250. But, if he sells the TV at 10% gain and the fridge at 5% loss, he gains ₹1500. Find the actual cost price of TV and that of the fridge. **[3]**

OR

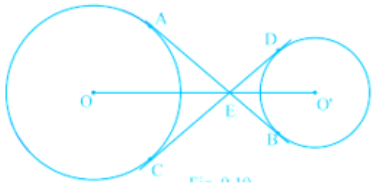
The sum of a two digit number and the number obtained by reversing the order of its digits is 121, and the two digits differ by 3. Find the number.

29. In the adjoining figure, point P is 26 cm way from the centre O of the circle and the length PT of the tangent drawn from P to the circle is 24 cm. What is the radius of the circle. **[3]**



OR

The common tangents AB and CD to two circles with centres O and O' intersect at E between their centres. Prove that the points O, E and O' are collinear.



30. If sin (A+B)=1 and cos (A-B) $= \frac{\sqrt{3}}{2}, 0^\circ < A + B \leq 90^\circ, A >$ B then find A and B. **[3]**

31. Compute the mode of the following data: **[3]**

Class Interval	1 - 5	6 - 10	11 - 15	16 - 20	21 - 25	26 - 31	31 - 35	36 - 40	41 - 45	46 - 50
Frequency	3	8	13	18	28	20	13	8	6	4

Section D

32. If the roots of the quadratic equation (x - a) (x - b) + (x - b)(x - c) + (x - c)(x - a) = 0 are equal. Then show that a = b = c **[5]**

OR

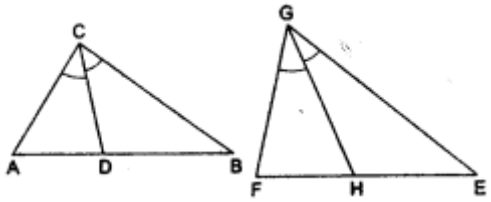
The length of the hypotenuse of a right-angled triangle exceeds the length of the base by 2 cm and exceeds twice the length of the altitude by 1 cm. Find the length of each side of the triangle.

33. In the given figure, CD and GH are respectively the bisectors of C and G respectively. If, $\Delta ABC \sim \Delta FEG$, prove that: **[5]**

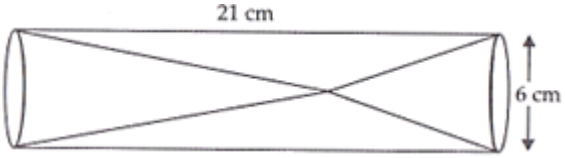
a. $\triangle ADC \sim \triangle FHG$

b. $\triangle BCD \sim \triangle EGH$

c. $\frac{CD}{GH} = \frac{AC}{FG}$



34. Two solid cones A and B placed in a cylindrical tube as shown in the figure. The ratio of their capacities are 2 : 1. Find the heights and capacities of cones. Also, find the volume of the remaining portion of the cylinder. **[5]**



OR

A solid toy is in the form of a hemisphere surmounted by a right circular cone. Height of the cone is 2 cm and the diameter of the base is 4 cm. If a right circular cylinder circumscribes the solid. Find how much more space it will cover.

35. During the medical check-up of 35 students of a class their weights were recorded as follows: **[5]**

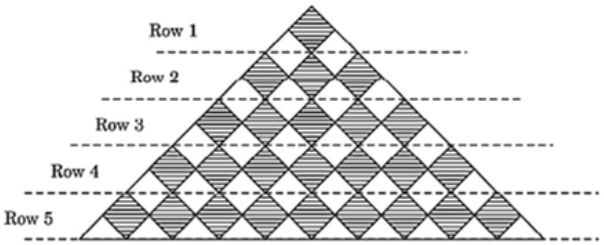
Weight(in kg)	38- 40	40 - 42	42 - 44	44 - 46	46 - 48	48 - 50	50 - 52
Number of students	3	2	4	5	14	4	3

Draw a less than type and a more than type ogive from the given data. Hence, obtain the median weight from the graph.

Section E

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

A fashion designer is designing a fabric pattern. In each row, there are some shaded squares and unshaded triangles.



i. Identify A.P. for the number of squares in each row. (1)

ii. Identify A.P. for the number of triangles in each row. (1)

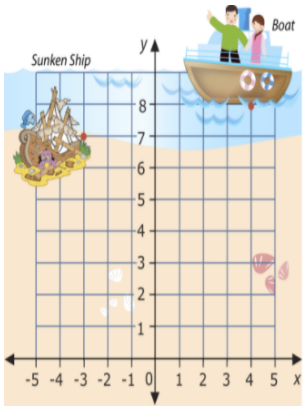
iii. If each shaded square is of side 2 cm, then find the shaded area when 15 rows have been designed. (2)

OR

Write a formula for finding total number of triangles in n number of rows. Hence, find S_{10}. (2)

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

Mary and John are very excited because they are going to go on a dive to see a sunken ship. The dive is quite shallow which is unusual because most sunken ship dives are found at depths that are too deep for two junior divers. However, this one is at 40 feet, so the two divers can go to see it.



They have the following map to chart their course. John wants to figure out exactly how far the boat will be from the sunken ship. Use the information in this lesson to help John figure out the following.

i. What are the coordinates of the boat and the sunken ship respectively? (1)

ii. How much distance will Mary and John swim through the water from the boat to the sunken ship? (1)

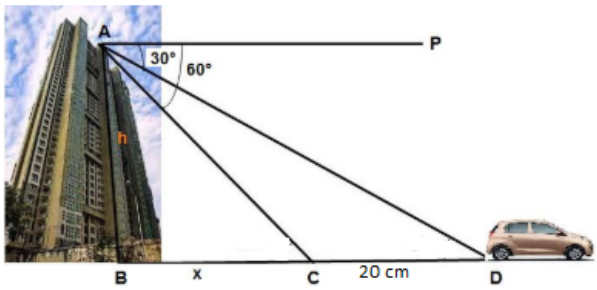
iii. If each square represents 160 cubic feet of water, how many cubic feet of water will Mary and John swim through from the boat to the sunken ship? (2)

OR

If the distance between the points (x, -1) and (3, 2) is 5, then what is the value of x? (2)

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

Vijay lives in a flat in a multi-story building. Initially, his driving was rough so his father keeps eye on his driving. Once he drives from his house to Faridabad. His father was standing on the top of the building at point A as shown in the figure. At point C, the angle of depression of a car from the building was 60^o. After accelerating 20 m from point C, Vijay stops at point D to buy ice cream and the angle of depression changed to 30^o.



i. Find the value of x. (1)

ii. Find the height of the building AB. (1)

iii. Find the distance between top of the building and a car at position D? (2)

OR

Find the distance between top of the building and a car at position C? (2)