S R Study Material

SPECIAL SAMPLE PAPER 1

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.

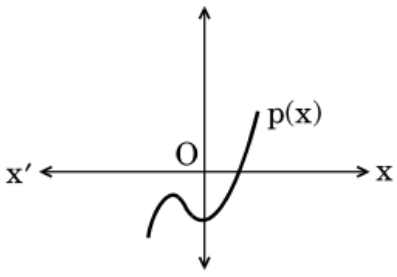
Section A

1. 120 can be expressed as a product of its prime factors as **[1]**

   a) 15×2^3 b) $5 \times 2^3 \times 3$

   c) $5 \times 8 \times 3$ d) $10 \times 2^2 \times 3$

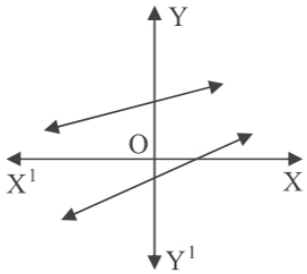
2. Number of zeroes of the polynomial p(x) shown in the Figure, are: **[1]**



   a) 2 b) 1

c) 0 d) 3

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. The ratio of the sum and product of the roots of the quadratic equation $5x^2 - 6x + 21 = 0$ is: **[1]**

a) 5 : 21 b) 21 : 5

c) 7 : 2 d) 2 : 7

5. If -5, x, 3 are three consecutive terms of an A.P., then the value of x is **[1]**

a) -2 b) 1

c) -1 d) 2

6. The distance of the point (5, 0) from the origin is **[1]**

a) $_5{}^2$ b) 5

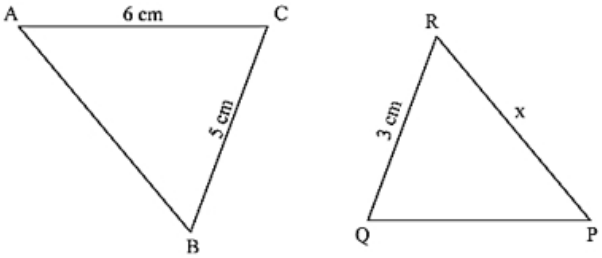
c) 0 d) $\sqrt{5}$

7. Distance of the point (a cos θ, a sin θ) from origin is: **[1]**

a) $\pm$a b) 1

c) $_a{}^2$ d) a

8. **[1]**

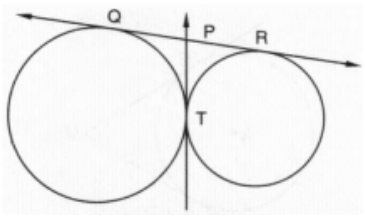


In the given figure, $\triangle ABC \sim \triangle QPR$. If AC = 6 cm, BC = 5 cm, QR = 3 cm and PR = x; then the value of x is:

a) 10 cm b) 3.6 cm

c) 2.5 cm d) 3.2 cm

9. In Figure, QR is a common tangent to the given circles touching externally at the point T. The tangent at T meets QR at P. If PT = 3.8 cm, then the length of QR (in cm) is **[1]**



a) 3.8 b) 1.9

c) 7.6 d) 5.7

10. How many tangents can be drawn to a circle from a point on it? **[1]**

a) Two b) Zero

c) Infinite d) One

11. If tan θ = 0, then the value of sin θ + cos θ is **[1]**

a) 0 b) 1

c) not defined d) $\frac{1}{2}$

12. If x = a cosθ and y = b sinθ, then the value of $b^2x^2 + a^2y^2$ is: **[1]**

a) a^4b^4 b) a^2b^2

c) $a^2 + b^2$ d) ab

13. A tree casts a shadow 7 m long on the ground, when the angle of elevation of the Sun is 45^o. The height of the tree is: **[1]**

a) 3.5 m b) $7\sqrt{3}$ m

c) 7 m d) $\frac{7}{3}\sqrt{3}$ m

14. The area of the sector of a circle of radius 12 cm is 60π cm^2. The central angle of this sector is: **[1]**

a) 120^o b) 75^o

c) 150^o d) 6^o

15. To warn ships of underwater rocks, a light house spreads a red colored light over a sector of angle 80^o to a distance of 16.5 km. Find the area of the sea over which the ships are warned. (Use π = 3.14) **[1]**

a) 189.97 km^2 b) 200 km^2

c) 135.7 km^2 d) 190.14 km^2

16. Let E be an event such that P(not E) = $\frac{1}{5}$, then P(E) is equal to: **[1]**

a) 0 b) $\frac{1}{5}$

c) $\frac{4}{5}$ d) $\frac{2}{5}$

17. If P (A) denotes the probability of an event A, then **[1]**

a) $0 \leq P(A) \leq 1$ b) $-1 \leq P(A) \leq 1$

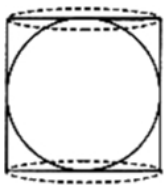
c) P(A) < 0 d) P(A) > 1

18. The mean and median of a distribution are 10 and 14 respectively. The value of mode is **[1]**

a) 6 b) 20

c) 2 d) 22

19. **Assertion (A):** In the given figure, a sphere is inscribed in a cylinder. The surface area of the sphere is not equal to the curved surface area of the cylinder. **[1]**



Reason (R): Surface area of sphere is $4\pi r^2$

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.

20. **Assertion (A):** The sum of the series with the nth term. t_n = (9 - 5n) is (465), when no. of terms n = 15. **[1]**

Reason (R): Given series is in A.P. and sum of n terms of an A.P. is $S_n = \frac{n}{2}[2a + (n-1)d]$

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.

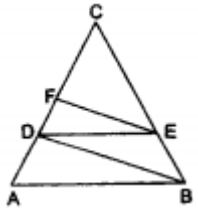
c) A is true but R is false.

d) A is false but R is true.

Section B

21. Define a prime number and a composite number. Hence explain why 7 × 11 × 13 + 13 is a composite number. **[2]**

22. In the given figure, $AB \| DE$ and $BD \| EF$ Prove that $\mathrm{DC}^2 = \mathrm{CF} \times \mathrm{AC}$. **[2]**



23. Prove that the tangent at any point of a circle is perpendicular to the radius through the point of contact. **[2]**

24. Prove that : $\frac{(\sin^4\theta + \cos^4\theta)}{1 - 2\sin^2\theta\cos^2\theta} = 1$. **[2]**

OR

Prove the identity:

$(1 + \tan A.\tan B)^2 + (\tan A - \tan B)^2 = \sec^2 A.\sec^2 B$

25. Find the area of a quadrant of a circle whose circumference is 22 cm. **[2]**

OR

Find the diameter of the circle whose area is equal to the sum of the areas of two circles having radii 4 cm and 3 cm.

Section C

26. There are 156, 208 and 260 students in groups A, B and C respectively. Buses are to be hired to take them for a field trip. Find the minimum number of buses to be hired, if the same number studets should be accommodated in each bus. **[3]**

27. Find the zeroes of the quadratic polynomial $7y^2 - \frac{11}{3}y - \frac{2}{3}$ and verify the relationship between the zeroes and the coefficients. **[3]**

28. The houses of a row are numbered consecutively from 1 to 49. Show that there is a value of x such that the sum of the numbers of the houses preceding the house numbered x is equal to the sum of the numbers of the houses following it. Find this value of x. **[3]**

[**Hint:** $S_{x-1} = S_{49} - S_x$]

OR

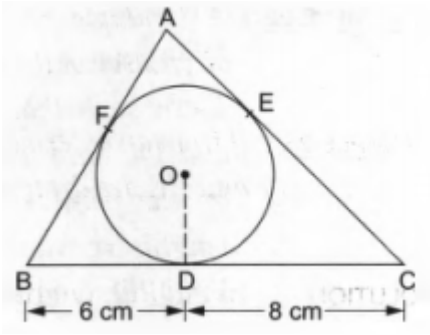
The first term of an AP is 5, the last term is 45 and the sum is 400. Find the number of terms and the common

difference.

29. Two concentric circles are of radii 5 cm and 3 cm. Find the length of the chord of the larger circle which touches the smaller circle. **[3]**

OR

In the given figure, a triangle ABC is drawn to circumscribe a circle of radius 3 cm, such that the segments BD and DC into which BC is divided by the point of contact D are of lengths 6 cm and 8 cm respectively. Find the side AB, if the area of $\triangle ABC$ is 63 cm^2



30. Prove that $\sec\theta(1 - \sin\theta)(\sec\theta + \tan\theta) = 1$ **[3]**

31. Find the mean of the following frequency distribution : **[3]**

Class :	0-6	6-12	12-18	18-24	24-30	30 –36	36 – 42
Frequency :	10	11	7	4	4	3	1

Section D

32. The diagonal of a rectangular field is 60 m more than the shorter side. If the longer side is 80 m more than the shorter side, find the length of the sides of the field. **[5]**

OR

A rectangular field is 20 m long and 14 m wide. There is a path of equal width all around it, having an area of 111 sq m. Find the width of the path.

33. The angles of elevation of the top of a tower from two points at distances of 5 metres and 20 metres from the base of the tower and in the same straight line with it, are complementary. Find the height of the tower. **[5]**

34. A hemispherical depression is cut out from one face of a cubical block of side 7 cm, such that the diameter of the hemisphere is equal to the edge of the cube. Find the surface area of the remaining solid. **[5]**

OR

A solid is in the shape of a right-circular cone surmounted on a hemisphere, the radius of each of them being 7 cm and the height of the cone is equal to its diameter. Find the volume of the solid.

35. The median of the following data is 16. Find the missing frequencies a and b if the total of frequencies is 70. **[5]**

Class	0 - 5	5 - 10	10 - 15	15 - 20	20 - 25	25 - 30	30 - 35	35 - 40
Frequency	12	a	12	15	b	6	6	4

Section E

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

Two schools **P** and **Q** decided to award prizes to their students for two games of Hockey ₹ x per student and Cricket ₹ y per student. School **P** decided to award a total of ₹ 9,500 for the two games to 5 and 4 students

respectively; while school **Q** decided to award ₹ 7,370 for the two games to 4 and 3 students respectively.

i. Represent the following information algebraically (in terms of x and y). (1)

ii. What is the prize amount for hockey? (1)

iii. Prize amount on which game is more and by how much? (2)

OR

What will be the total prize amount if there are 2 students each from two games? (2)

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

Ashok wanted to determine the height of a tree on the corner of his block. He knew that a certain fence by the tree was 4 feet tall. At 3 PM, he measured the shadow of the fence to be 2.5 feet tall. Then he measured the tree's shadow to be 11.3 feet.

i. What is the height of the tree? (1)

ii. What will be length of shadow of tree at 12:00 pm? (1)

iii. Write the name triangle formed for this situation. (2)

OR

What will be the length of wall at 12:00 pm? (2)

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

A satellite image of a colony is shown below. In this view, a particular house is pointed out by a flag, which is situated at the point of intersection of x and y-axes. If we go 2 cm east and 3 cm north from the house, then we reach to a Grocery store. If we go 4 cm west and 6 cm south from the house, then we reach to an Electricians's shop. If we go 6 cm east and 8 cm south from the house, then we reach to a food cart. If we go 6 cm west and 8 cm north from the house, then we reach a bus stand.

Scale:

x-axis : 1 cm = 1 unit

y-axis : 1 cm = 1 unit

i. What is the distance between the grocery store and food cart? (1)

ii. What is the distance of the bus stand from the house? (1)

iii. If the grocery store and electricians shop lie on a line, then what will be the ratio of distance of house from grocery store to that from electrician's shop? (2)

OR

What are the ratio of distances of the house from bus stand to food cart? (2)