VSI INTERNATIONAL SCHOOL

SP-6(A/1), Sitapura Industrial Area, Pratap Nagar-Jaipur (Raj.)
Affiliated to CBSE Delhi, Affiliation No: -1731160

SAMPLE PAPER - I (2025-26)

SUBJECT – MATHEMATICS BASIC (241)

CLASS – X

TIME ALLOWED: 3 HOURS **MAXIMUM MARKS: 80**

General Instructions:

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. And internal choice has been provided in all the 2 marks questions of Section E.

9. Draw neat and clean figures wherever required.

10. Take $\pi = \frac{22}{7}$ wherever required if not stated.

11. Use of calculators is not allowed.

Section – A

Section A consists of 20 questions of 1 mark each

1. The largest number which divides 70 and 125 leaving remainders 5 and 8 respectively is

(a) 13 (b) 65 (c) 875 (d) 1750

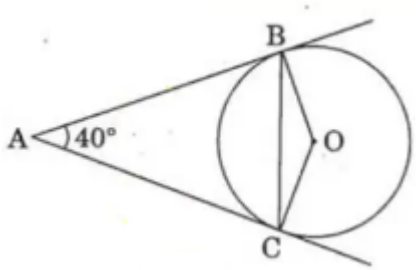
2. The co-ordinates of the point P(3, 5) on reflection in the x -axis are :

(a) (3, 5) (b) (-3, -5) (c) (3, -5) (d) (-3, 5)

2. What is the value of k such that the following pair of equations have infinitely many solutions?
x – 2y = 3 and – 3x + ky = – 9.

(a) (–6) (b) –3 (c) 3 (d) 6

4. In the given figure, AB and AC are tangents to the circle with centre O such that BAC = 40°, then BOC is equal to



(a) 40° (b) 50° (c) 140° (d) 150°

5. If $\sin\theta + \cos\theta = \sqrt{2}$, then $\tan\theta + \cot\theta$ =

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

6. Values of k for which the quadratic equation $2x^2 - kx + k = 0$ has equal roots, is:

(a) 0 only (b) 4 (c) 8 only (d) 0, 8

7. The area of a circle that can be inscribed in a square of side 6 cm is:

(a) 36π cm^2 (b) 18π cm^2 (c) 12π cm^2 (d) 9π cm^2

8. A girl calculates that the probability of her winning the first prize in a lottery is 0.08. If 6000 tickets are sold, how many tickets has she bought?

(a) 40 (b) 240 (c) 480 (d) 750

9. If $\sin 2A = \frac{1}{2}\tan^2 45°$ where A is an acute angle, then the value of A is

(a) 60° (b) 45° (c) 30° (d) 15°

10. Arnav has 40 cm long red and 84 cm long blue ribbon. He cuts each ribbon into pieces such that all pieces are of equal length. What is the length of each piece?

(a) 4 cm as it is the HCF of 40 and 84 (b) 4 cm as it is the LCM of 40 and 84
(c) 12 cm as it is the LCM of 40 and 84 (d) 12 cm as it is the HCF of 40 and 84

11. If α and β are the zeroes of $f(x) = 2x^2 + 8x - 8$, then

(a) $\alpha + \beta = \alpha\beta$ (b) $\alpha + \beta > \alpha\beta$ (c) $\alpha + \beta < \alpha\beta$ (d) $\alpha + \beta + \alpha\beta = 0$

12. The ratio of the total surface area to the lateral surface area of a cylinder with base radius 80 cm and height 20 cm is

(a) 1 : 2 (b) 2 : 1 (c) 3 : 1 (d) 5 : 1

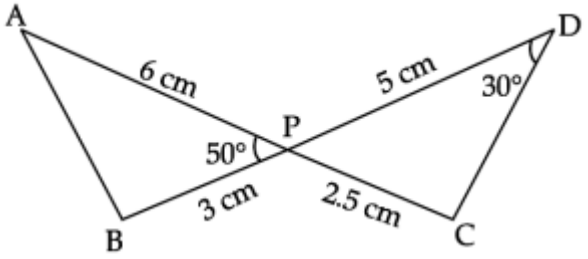
13. The minute hand of a clock is 84 cm long. The distance covered by the tip of minute hand from 10:10 am to 10:25 am is:

(a) 44 cm (b) 88 cm (c) 132 cm (d) 176 cm

14. If a letter is chosen at random from the letters of English alphabets, then the probability that it is a letter of the word 'MATHEMATICS' is:

(a) 4/13 (b) 9/26 (c) 5/13 (d) 11/26

15. In the figure given below, two line segments AC and BD intersect each other at the point P such that PA = 6 cm, PB = 3 cm, PC = 2.5 cm, PD = 5 cm, ∠APB = 50° and ∠CDP = 30°. Then, ∠PBA is equal to:



(a) 50° (b) 30° (c) 60° (d) 100°

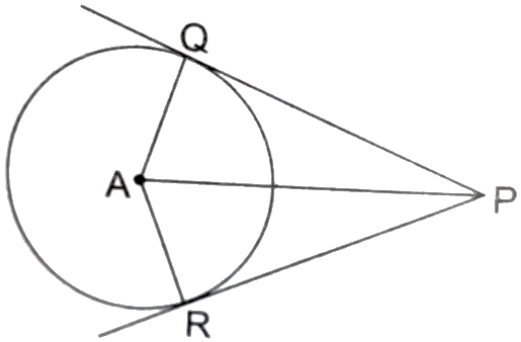
16. If A(4, –2), B(7, –2) and C(7, 9) are the vertices of a ΔABC, then ΔABC is

(a) equilateral triangle
(b) isosceles triangle
(c) right angled triangle
(d) isosceles right angled triangle

17. The mean and median of a distribution are 14 and 15, respectively. The value of the mode is:

(a) 16 (b) 17 (c) 18 (d) 13

18. In figure, PQ and PR are tangents to a circle with centre A. If QPA = 27°, then QAR equals to



(a) 63° (b) 153° (c) 126° (d) 117°

Direction for questions 19 & 20: In question numbers 19 and 20, a statement of **Assertion (A)** is followed by a statement of **Reason (R).**
Choose the correct option:

(A) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(B) Both assertion (A) and reason (R) are true but reason (R) is not correct explanation of assertion(A).
(C) Assertion (A) is true but reason (R) is false.
(D) Assertion (A) is false but reason (R) is true.

19. **Assertion (A):** If product of two numbers is 5780 and their HCF is17, then their LCM is 340.

Reason (R): HCF is always a factor of LCM.

20. **Assertion (A):** $\sin(A + B) = \sin A + \sin B$

Reason (R): For any value of θ, $1 + \tan^2\theta = \sec^2\theta$

Section – B

Section B consists of 5 questions of 2 marks each

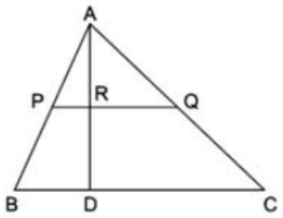
21. (A) Find 10th term from end of the AP 4, 9, 14, ... , 254.

OR

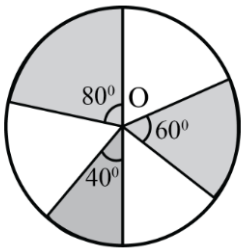
(B) If seven times the 7th term of an A.P. is equal to eleven times the 11th term, then what will be its 18th term?

22. ABC is a right triangle, right angled at C. If A = 30° and AB = 40 units, find the remaining two sides of ΔABC.

23. In the figure, AP = 3 cm, AR = 4.5 cm, AQ = 6 cm, AB = 5 cm and AC = 10 cm. Find the length of AD.

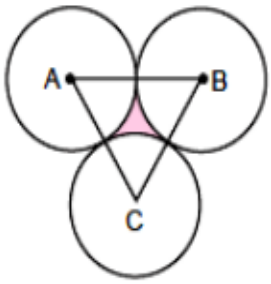


24. (A) In the given figure, three sectors of a circle of radius 7 cm, making angles of 60°, 80° and 40° at the centre are shaded. The area of the shaded region (in cm^2) is [Use $\pi = \frac{22}{7}$]

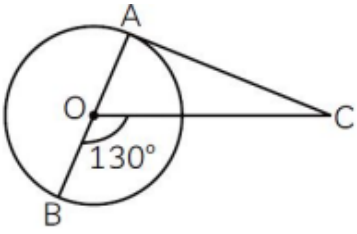


OR

(B) ABC is an equilateral triangle. The area of the shaded region if the radius of each of the circle is 1 cm, is



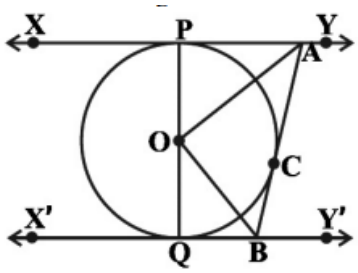
25. In the given figure, AOB is a diameter of a circle with centre O and AC is a tangent to the circle at A. If If ∠BOC = 130°, then find ∠ACO.



Section – C

Section C consists of 6 questions of 3 marks each

26. In the below figure, XY and X′Y′ are two parallel tangents to a circle with centre O and another tangent AB with point of contact C intersecting XY at A and X′Y′ at B. Prove that ∠AOB = 90°.



27. Prove that √5 is an irrational number.

28. 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.

29. (A)

$$\text{Evaluate: } \frac{5\sin^2 30^0 + \cos^2 45^0 + 4\tan^2 60^0}{2\sin 30^0 \cos 60^0 + \tan 45^0}$$

OR

(B)

$$\text{Prove that } \frac{\sin\theta + \cos\theta}{\sin\theta - \cos\theta} + \frac{\sin\theta - \cos\theta}{\sin\theta + \cos\theta} = \frac{2\sec^2\theta}{\tan^2\theta - 1}$$

30. A box contains 19 balls bearing numbers 1, 2, 3, ..., 19. A ball is drawn at random from the box. What is the probability that the number on the ball is

(i) a prime number

(ii) divisible by 3 or 5

(iii) neither divisible by 5 nor by 10

31. (A) Using graphical method, solve the system of equations: 3x + y + 4 = 0 and 3x – y + 2 = 0

OR

(B) The age of the father is twice the sum of the ages of his two children. After 20 years, his age will be equal to the sum of the ages of the children. Find the age of the father.

Section – D

Section D consists of 4 questions of 5 marks each

32. The lengths of 40 leaves of a plant are measured correct to nearest millimetre, and the data obtained is represented in the following table:
Find the median length of the leaves.

Length (in mm)	Number of leaves
118 – 126	3
127 – 135	5
136 – 144	9
145 – 153	12
154 – 162	5
163 – 171	4
172 – 180	2

33. If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, then prove that the other two sides are divided in the same ratio. Also in ΔABC, PQ || BC. If PB = 6 cm, AP = 4 cm, AQ = 8 cm, find the length of AC.

34. (A) In a class test, the sum of Arun's marks in Hindi and English is 30. When he got 2 marks more in Hindi and 3 marks less in English, the product of the marks would have been 210. Find his marks in the two subjects.

OR

(B) If α and β are roots of the quadratic equation $x^2 - 7x + 10 = 0$, find the quadratic equation whose roots are α^2 and β^2.

35. (A) A conical vessel of radius 6 cm and height 8 cm is completely filled with water. A sphere is lowered into the water and its size is such that when it touches the sides, it is just immersed. What fraction of water overflows?

OR

(B) A rocket is in the form of a right circular cylinder closed at the lower end and surmounted by a cone with the same radius as that of the cylinder. The diameter and height of the cylinder are 6 cm and 12 cm, respectively. If the slant height of the conical portion is 5 cm, find the total surface area and volume of the rocket [Use = 3.14].

Section – E

Section D consists of 3 questions of 4 marks each

36. Mohan is an auto driver. His autorickshaw was too old and he had to spend a lot of money on repair and maintenance every now and then. One day he got to know about the EV scheme of the Government of India where he can not only get a good exchange bonus but also avail heavy discounts on the purchase of an electric vehicle. So, he took a loan of 1,18,000 from a reputed bank and purchased a new autorickshaw. Mohan repays his total loan of 118000 rupees by paying every month starting with the first instalment of 1000 rupees.

On the basis of the above information, answer the following questions:

(i) If he increases the instalment by 100 rupees every month, then what amount will be paid by him in the 30th instalment? [1]

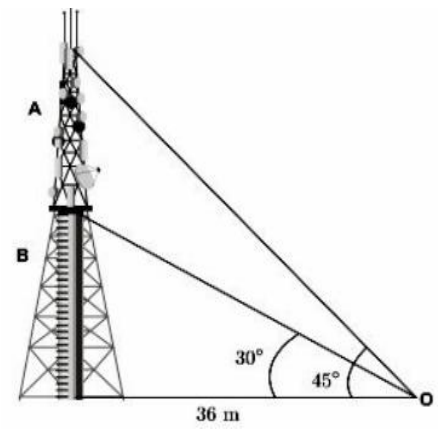
(ii) If he increases the instalment by 100 rupees every month, then what amount of loan does he still have to pay after 30th instalment? [2]

OR

(ii) If he increases the instalment by 200 rupees every month, then what amount would he pay in 40th instalment? [2]

(iii) If he increases the instalment by 100 rupees every month, then what amount will be paid by him in the 100th instalment [1]

37. Radio towers are used for transmitting a range of communication services including radio and television. The tower will either act as an antenna itself or support one or more antennas on its structure, including microwave dishes. They are among the tallest human-made structures. There are 2 main types: guyed and



self-supporting structures. On a similar concept, a radio station tower was built in two sections A and B. Tower is supported by wires from a point O. Distance between the base of the tower and point O is 36 m. From point O, the angle of elevation of the top of section B is 30° and the angle of elevation of the top of section A is 45°.

On the basis of the above information, answer the following questions:

(i) What is the height of the section B? [1]

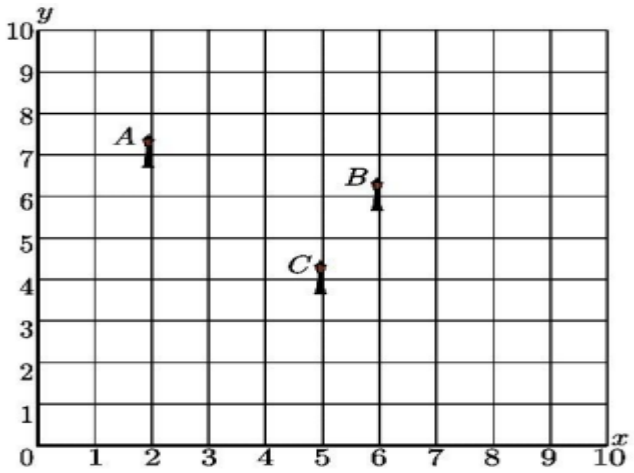
(ii) What is the height of the section A? [1]

(iii) What is the length of the wire structure from the point O to the top of section A? [2]

OR

(iii) What is the length of the wire structure from the point O to the top of section B? [2]

38. Resident Welfare Association (RWA) of a Gulmohar Society in Delhi have installed three electric poles A, B and C in a society's common park. Despite these three poles, some parts of the park are still in dark. So, RWA decides to have one more electric pole D in the park. The park can be modelled as a coordinate system given below.



On the basis of the above information, answer the following questions:

(i) What is the position of the pole C? [1]

(ii) What is the distance of the pole B from the corner O of the park? [1]

(iii) Find the position of the fourth pole D so that four points A, B, C and D form a parallelogram. [2]

OR

(iii) What is the distance between poles A and C? [2]

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