KENDRIYA VIDYALAYA SANGATHAN,ERNAKULAM REGION

PRE BOARD EXAMINATION 2025-26

CLASS : X MATHEMATICS(BASIC) Subject Code: 241

Duration: 3 hours Maximum Marks : 80

General Instructions

Read the following instructions carefully and follow them:

1. This question paper contains 38 questions. All Questions are compulsory.
2. This Question Paper is divided into 5 Sections A, B, C, D and E.
3. In Section A, Question numbers 1-18 are multiple choice questions (MCQs) and question no.19 and 20 are Assertion- Reason based questions of 1 mark each.
4. In Section B, Question numbers 21-25 are very short answer (VSA) type questions, carrying 02 marks each.
5. In Section C, Question numbers 26-31 are short answer (SA) type questions, carrying 03 marks each.
6. In Section D, Question numbers 32-35 are long answer (LA) type questions, carrying 05 marks each.
7. In Section E, Question numbers 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. There is no overall choice. 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. Take $\pi = \frac{22}{7}$ wherever required, if not stated.
10. Use of calculators is not allowed.

SECTION – A

(Multiple Choice Questions)

Each MCQ of 1mark, has four options with only one correct option, choose the correct option

1. HCF of $5^2 \times 3^2$ and $3^4 \times 5^3$ is

   (a) $5^2 \times 3^2$ (b) $5^3 \times 3^2$ (c) $5^2 \times 3^3$ (d) $5^4 \times 3^2$

2. The pair of equations $x = 0$ and $y = 3$ has

   (a) No solution (b) One solution (c) Two solutions (d) Infinitely many solutions.

3. The value of $\text{Sin}^2 30^0 + \text{Cos}^2 30^0$ is

   (a) 2 (b) 1 (c) – 1 (d) 0

4. The cost of 4 kg of apples and 3 kg of grapes was found to be ₹ 320.Represent this situation algebraically. Take cost of 1 kg of apple as *x* and cost of 1 kg of grape as *y*.

   (a) $3x + 4y = 320$ (b) $4x + 3y = 320$ (c) $3x – 4y = 320$ (c) $4x – 3y = 320$

5. If one root of the equation $4x^2 – 2x + k – 4 = 0$ is reciprocal of the other, the value of k is

   (a) 4 (b) – 4 (c) 8 (d) - 8

6. If $2y + 1$, $4y - 3$, $8y + 3$ are three consecutive terms of an AP , then the value of y is

(a) – 5 (b) 5 (c) 13 (d) –13

7. The 31st term of an AP whose first two terms are – 3 and 4 is

(a) – 213 (b) 213 (c) 207 (d) – 207

8. The perimeter of the triangle whose vertices are (4 , 0) , (0 , 3) and (0 , 0) is

(a) 7 (b) 5 (c) $3\sqrt{5}$ (d) 12

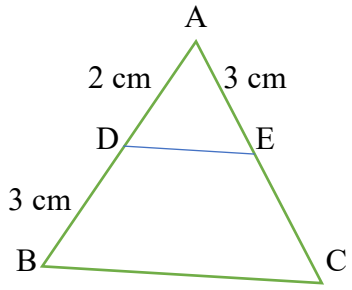
9. A point (x , y) is at a distance of 5 units from the origin. How many such points lie in the first quadrant.

(a) 2 (b) 1 (c) 0 (d) Countless

10. A 15 metres high tower casts a shadow 24 metres long at a certain time and at the same time , a telephone pole casts a shadow 16 metres long, the height of telephone pole is

(a) 10 m (b) 11 m (c) 12 m (d) 13 m

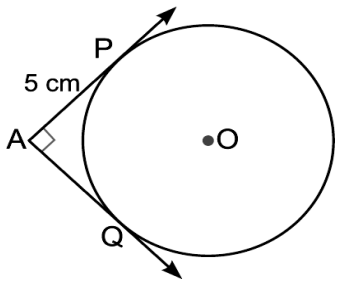
11.In figure DE // BC , AD = 2 cm, DB = 3 cm and AE = 3 cm, the length of EC is



(a) 4.5 cm (b) 7.5 cm (c) 4 cm (d) 5 cm

12. In the below figure, the pair of tangents AP and AQ drawn from an external point A to a circle with centre O are perpendicular to each other and length of each tangent is 5 cm. Then radius of the circle is

(a) 10 cm (b) 2.5 cm (c) 7.5 cm (d) 5 cm



13. In a triangle ABC, right angled at B,the value of Cos (A + C) is

(a) 0 (b) 1 (c) $\sqrt{2}$ (d) $\frac{1}{\sqrt{2}}$

14. In the following frequency distribution table, the sum of the lower limit and upper limit of modal class is

Class Interval	0-5	5-10	10-15	15-20	20-25
Frequency	9	10	12	18	11

(a) 15 (b) 25 (c) 45 (d) 35

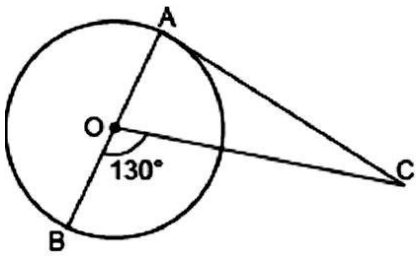
15. When the Mode and Mean of a distribution are given, which of the following can used to find the Median

(a) Median = $\frac{2Mode+Mean}{3}$ (b) Median = $\frac{3Mode-Mean}{3}$ (c)Median = $\frac{Mode+2Mean}{3}$

(d) Median = $\frac{Mode+Mean}{3}$

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

(a) 50^0 (b) 90^0 (c) 40^0 (d) None of these



17. The length of an arc of a circle of radius 14 cm making an angle of 60^0 at the centre is

(a) $\frac{11}{3}$ cm (b) $\frac{22}{3}$ cm (c) $\frac{33}{3}$ cm (d) $\frac{44}{3}$ cm

18. A card is drawn from a deck of 52 cards. The probability of getting a Queen or Jack is

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

Each of the following questions contains two statements i.e., ASSERTION and REASON, and has following four choices. Only one of which is the correct answer.

19. ASSERTION (A): If Δ ABC ~ Δ DEF , then $\frac{AB}{DF}=\frac{BC}{DE}=\frac{AC}{EF}$

REASON (R): The corresponding sides of two similar triangles are proportional

(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 the 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.

20. ASSERTION (A): If P (E) = 0.7 , then P (not E) = 0.3

REASON(R):The sum of the probabilities of an event and its complement is always 1

(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 the 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.

SECTION – B

This section comprises of VSA of 2 marks each

21. Find the LCM of the smallest two-digit composite number and greatest one-digit composite number.

OR

On a morning walk, three persons step off together and their steps measure 40 cm , 42 cm and 45 cm respectively. At what minimum distance each should walk, so that each can cover the same distance in complete steps.

22. Prove that tangents drawn at the ends of a diameter of a circle are parallel.

23. Santhosh is 3 times as old as his son. Five years later, he shall be two and a half time as old as his son. How old is Santhosh at present?

OR

Solve the following system of linear equations: $7x - 2y = 5$ and $8x + 7y = 15$ and verify your answer.

24. Evaluate $2\sqrt{2} \cos 45^0 \sin 30^0 + 2\sqrt{3} \cos 30^0$

OR

If $A = 60^0$ and $B = 30^0$, verify that: $\sin (A + B) = \sin A \cos B + \cos A \sin B$

25. If the quadratic equation $a x^2 + b x + c = 0$ has two real and equal roots, then write 'c' in terms of a and b

SECTION – C

This section comprises of SA type questions of 3 marks each

26. Prove that $\sqrt{3}$ is an irrational number.

27. From an external point P, tangents PA and PB are drawn to a circle with centre O. If OP = 17 cm and radius = 8 cm,find the perimeter of quadrilateral OAPB

28. Calculate median marks of the following data

Marks	0 - 10	10 - 20	20 -30	30 -40	40-50	Total
No of students	8	16	36	34	6	100

OR

The arithmetic mean of the following frequency distribution is 53. Find the value of k.

Class	0 – 20	20 – 40	40 – 60	60 – 80	80 – 100
Frequency	12	15	32	k	13

29. A part of monthly hostel charges in a college is fixed and the remaining depends on the number of days one has taken food in the mess. When a student 'Kiran' takes food for 22 days, he has to pay Rs. 1380 as hostel charges; whereas a student 'Shankar, who takes food for 28 days, pays Rs. 1680 as hostel charges. Find the fixed charges and the cost of food per day.

OR

The ratio of income of two persons is 9 : 7 and the ratio of their expenditure is 4 : 3, if each of them manage to save Rs. 2000/month. Find their monthly incomes.

30.Prove that $\frac{1+\sin A}{Cos\ A} + \frac{Cos\ A}{1+Sin\ A} = 2$ Sec A

31. If the sum of 3rd and 8th terms of an AP is 7 and the sum of 7th and the 14th terms is – 3 ,find the 15th term.

SECTION – D

This section *comprises of LA type questions of 5 marks each*

32. Prove that a line drawn parallel to one side of a triangle intersecting other two sides in distinct points, divides the other two sides in the same ratio.

33. Solve the following system of equations graphically for x and y: 3x + 2y = 12; 5x – 2y = 4. Find the co-ordinates of the points where the lines meet the y-axis

OR

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.

34. From the top of a 60 m high tower, the angles of depression of the top and the bottom of a building are 45° and 60° respectively. Find the height of the building. [Take √3 = 1.73]

OR

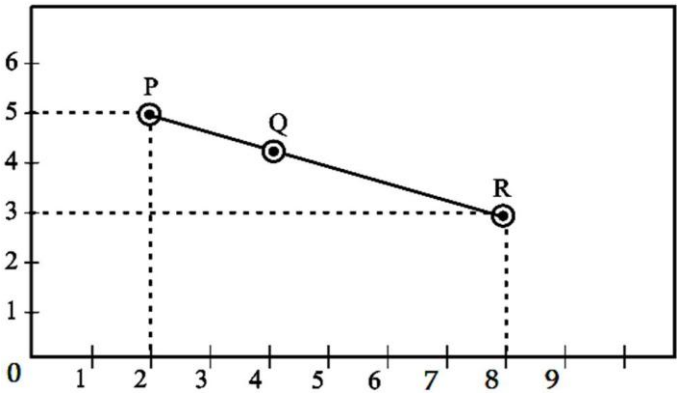
As observed from the top of a 75 m high light house from the sea-level, the angles of depression of two ships are 30º and 45º. If one ship is exactly behind the other on the same side of the light house, find the distance between the two ships [Use √3 = 1.73]

35. A student was asked to make a model shaped like a cylinder with two cones attached to its ends by using a thin aluminium sheet. The diameter of the model is 3 cm and its total length is 12 cm. If each cone has a height of 2 cm, find the volume of air contained in the model.

SECTION - E

This section comprises of 3 case-study based questions of 4 marks each with three sub-parts.

36. A group of Class X students goes to picnic during vacation. There were three different slides and three friends Ajay, Ram and Shyam are sliding in the three slides. The position of the three friends shown by P, Q and R in three different slides are given below:



Consider O as origin, answer the questions given below

(i) Find the distance PR

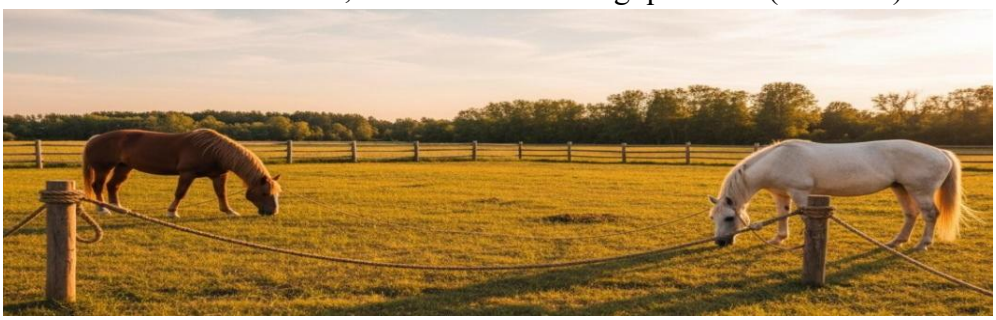
(ii) Find the coordinates of the midpoint of PR

(iii) (a)Find the coordinates of the point on the X axis which is equidistant from P and R

OR

(b)Find the coordinates of the point Q which divides the line segment PR in the ratio 1:2

37. Two horses are tied at two corners of a square shaped grass field of side 20 m. The first one tied by means of a 5 m long rope while the second one tied by means of a 10 m long rope .Based on this information, answer the following questions ($\pi = 3.14$)



(i) Find the area of the grass field covered by the horse tied with a rope of length 5 m.

(ii) Find the area of the grass field covered by the horse tied with a rope of length 10 m.

(iii) (a) Find the ratio of the areas covered by the horses

OR

(b)Find the area of the grass field which is not covered by the horses.

38. Ramesh and Shivam are best friends. They are staying in the same colony. Both are studying in the same class and in the same school. During Autumn break Shivam visited Ramesh's house to play Ludo. They decided to play Ludo with 2 dice. Ramesh wins if the sum of the outcomes on the two dice is 7,while Shivam wins if the sum is 8.Based on this information, answer the following questions

(i) Find the probability that Ramesh wins the game.

(ii) What is the probability of winning the game by Shivam?

(iii) (a) Determine the probability that Ramesh gets a doublet on throwing two dice.

OR

(b) Find the probability that the sum of the numbers appearing on two dice is a prime number?