KENDRIYA VIDYALAYA SANGATHAN ERNAKULAM REGION

PRE BOARD - 1 (2026-27)

MATHEMATICS BASIC (241)

Max. Marks:80

CLASS : X Time: 3 Hrs

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. 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 $\pi = 22/7$ wherever required if not stated.

11. Use of calculators is not allowed.

SECTION A

1. The HCF of $(3^3 \times 5^2 \times 2)$, $(3^4 \times 5^3 \times 2^2)$ *and* $(3^3 \times 5 \times 2)$ is

   (A) 420 (B) 270 (C) 780 (D) 8100

2. The value of k for which the pair of linear equations $kx+3y=k-3$ and $12x+ky=k$ has infinitely many solutions is:

   (A) 6. (B) -6. (C) ± 6. (D) 0

3. The sum of ages of father and son is 35 years and the product of their ages is 150. Then, the father's age is

(A) 45. (B)50. (C) 30. (D) 25

4. The distance between the points (3, 7) and (−2, 5) is

(A) √13. (B)√29 (C) 13 (D) 31

5. If two tangents inclined at 60^0 are drawn to a circle of radius 3cm, then the length of each of the tangent is equal to

(A) 3√3 cm (B) 3 cm (C) 3√2 cm. (D) 2√3 cm

6. If △PQR ~△XYZ such that XY = 4cm, YZ=4.5 cm and ZX=6.5 cm, PQ=8 cm, then perimeter of △PQR is equal to

(A) 25 cm. (B) 23 cm. (C) 15 cm. (D) 30 cm

7. If cosecA=2, cotA=√3p, then value of p is

(A) √3 (B) 2 (C) 2/√3 (D) 1

8. If the perimeter and area of a circle are numerically equal, then the radius of the circle is:

(A) 2 units (B) π units (C) 4 units (D) 7 units

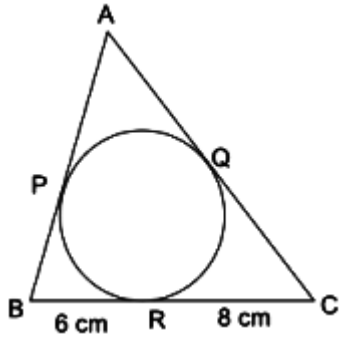
9. The 4 th term from the end of the A.P −8, −5, −2, … ,49 is

(A) 40 (B) 18 (C) 37 (D) 38

10. If ΔABC and ΔDEF are similar and 2AB = DE, BC = 8 cm, then EF is

(A) 4 cm (B) 16 cm (C) 8 cm (D) 12 cm

11. If perimeter of given triangle is 38 cm, then length AP is equal to:



(A) 19 cm (B) 5 cm (C) 10 cm (D) 8 cm

12. (1 – cos θ) (cot θ + cosec θ) is equal to

,(A) sin θ (B) sec θ (C) tan θ (D) cot θ.

13. Two cubes each of volume 64 cm^3 are joined end to end. Then, the surface area of the resulting cuboid is:

(A) 640 cm^2 (B) 160 cm^2 (C) 460 cm^2 (D) 604 cm^2

14. The roots of quadratic equation $3x^2 - 4\sqrt{3}x + 4 = 0$ are

(A) not real (B) real and equal (C) rational and distinct (D) irrational and distinct

15. A quadratic polynomial, whose zeroes are -4 and -5, is:

(A) x^2-9x + 20 (B) x^2 + 9x + 20 (C) x^2-9x- 20 (D) x^2 + 9x- 20

16. Two tangents PA and PB are drawn from an external point P to a circle with center O If ∠APB=70º, then ∠AOB is equal to:

(A) 100º. (B) 110º. (C) 120º. (D) 140º

17. If the ratio of the height of a pole to the length of its shadow on the ground is 1: $\sqrt{3}$ then the angle of elevation of the Sun is:

(A) 30◦. (B) 45◦. (C) 60◦. (D) 90◦

18. A circular clock hand of length 6 cm sweeps across the clock face in 15 minutes. The area swept by the minute hand is:

(A)9π cm2. (B)18π cm2. (C) 12π cm2 (D) 6π cm2

DIRECTION:

In question number 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 and 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.

19. Assertion(A): The sequence −1, −1 − 1, . . . , −1 is an AP.

Reason(R): In an AP, $an - an{-}1$ is constant where $n \geq 2$ and $n \in N$

20. Assertion(A): (2 + √3)√3 is an irrational number

Reason(R): product of two irrational numbers is always irrational.

SECTION- B (5 ×2 = 10)

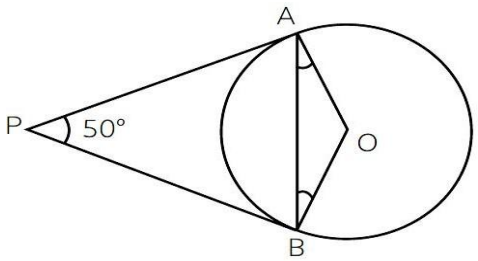
21. Two signal lights at a railway junction blink at regular intervals. Signal A blinks every 18 seconds, and signal B blinks every 24 seconds both signals blink together at 10.00 AM, at what exact time will they next blink together

OR

A gardener has three metal pipes of lengths 72 cm,120 cm and 168 cm.The needs to cut all three pipes into smaller pieces of equal length without any leftover pipe waste. What is the minimum total number of equal pieces he can obtain?

22. If α , β are the zeroes of the polynomials $f(x) = x^2 + 5x + 8$, then find the value of $\frac{1}{\alpha} + \frac{1}{\beta}$

23. If tangents PA and PB from a point P to a circle with centre O are inclined to each other at angle of 50°, then find $\angle$ POA



24. If $\sin(A - B) = \frac{1}{2}$, $\cos(A + B) = \frac{1}{2}$, $0^0 < A + B \leq 90^0$, A > B, find A and B

OR

Simplify : $(\sin A + \cos A)^2 + (\cos A - \sin A)^2$

25. The minute hand of a clock is 10 cm long. Find the area of the face of the clock described by the minute hand 9 A.M and 9.35 A.M.

SECTION C

26. Prove that $\sqrt{5}$ is an irrational number

27. Find the zeroes of the quadratic polynomial $6x^2 - 7x - 3$ and verify the relationship between the zeroes and the coefficients.

28. In ΔABC, points D and E lie on sides AB and AC respectively such that DE $\parallel$ BC. If AD = x, DB = x - 2, AE = x + 2, and EC = x - 1, find the value of x.

29. Prove the following trigonometric identity:
$(\sin\theta - 2\sin^3\theta) / (2\cos^3\theta - \cos\theta) = \tan\theta$

30. A chord of a circle of radius 12 cm subtends an angle of 120° at the centre. Find the area of the corresponding segment of the circle. (Use $\pi = 3.14$ and $\sqrt{3} = 1.73$)

31. A solid toy is in the form of a hemisphere surmounted by a right circular cone. The height of the cone is 2 cm and the diameter of the base is 4 cm. Determine the total volume of the toy. (Use $\pi = 3.14$)

SECTION D

32. Draw the graphs of the equations 2x + y = 6 and 2x - y + 2 = 0. Shade the region bounded by these lines and the x-axis. Find the area of this shaded region.

33. State and prove the Basic Proportionality Theorem (Thales Theorem).

34. As observed from the top of a 75 m high lighthouse from the sea-level, the angles of depression of two ships are 30° and 45°. If one ship is exactly behind the other on the same side of the lighthouse, find the distance between the two ships. (Use $\sqrt{3} = 1.73$)

35. A tent is in the shape of a cylinder surmounted by a conical top. If the height and diameter of the cylindrical part are 2.1 m and 4 m respectively, and the slant height of

the top is 2.8 m, find the area of the canvas used for making the tent. Also, find the cost of the canvas at the rate of ₹500 per m^2.

CASE STUDY QUESTIONS **(3 ×4 = 12)**

36. In a school, students thought of planting trees in and around the school to reduce air pollution. It was decided that the number of trees ,that each section of each class will plant, will be same as the class, in which they are studying, a section of class I will plant 1 tree, a section of class II will plant 2 trees and so on till class XII.There are four sections of each class. Based on this, answer the following.



(i) Find the number of trees planted by students of Class III ? 1

(ii) The number of trees planted by different classes forms an A P,find the common difference of the AP formed. 1

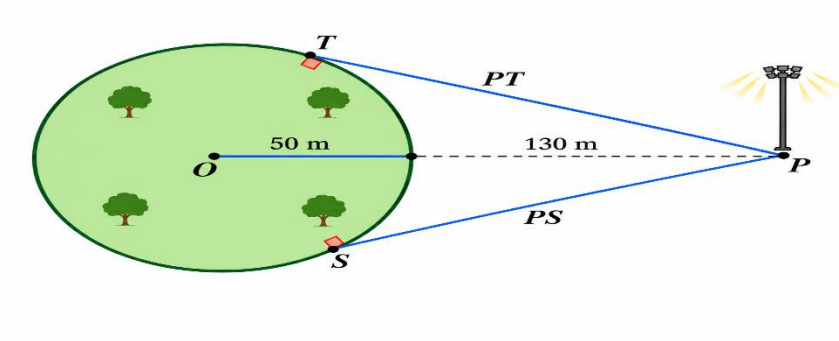
(iii) (A) Find the total number of trees planted by students of primary classes 2

(Classes I to V)

(iii) (B) Find the total number of trees planted by the students of all classes 2

(Classes I to XII)

37. The municipal corporation of a city is designing a circular public park with a radius of 50 m centred at point O.A high-mast lighting pole is installed at a point P outside the park, located at a distance of 130 m from the centre O.Two straight walking paths and PS are constructed from point P to touch the circular park boundary at points T and S respectively, acting as tangents to the circle.



Based on the above, answer the following

(i) What is the length of the walking path PT ? 1

(ii) What type of quadrilateral is formed by the shape OTPS ? 1

(iii) (A) Find the area of the quadrilateral OTPS 2

OR

(iii) (B) Calculate the perimeter of the quadrilateral OTPS 2

38. The corners of a rectangular playground are A(1,1),B(9,1),C(9,7) and D(1,7).A flagpole is placed at the intersection point of its diagonals.



Based on the above, answer the following questions

(i) Calculate the length of AB 1

(ii) Find the length of diagonal BD 1

(iii) (A) Find the coordinates of the point, where the flagpole is placed. 2

OR

(iii) (B) Find the perimeter of the playground. 2