

KENDRIYA VIDYALAYA SANGATHAN JABALPUR REGION
PRE-BOARD- EXAMINATION 2024 -25 SET - A
SUBJECT: MATHEMATICS (STANDARD)(041)
CLASS: X

MAX. MARKS: 80

MAX TIME: 3:00 HRS

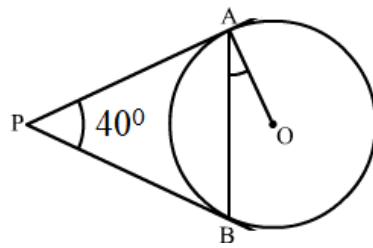
General Instruction: Read the following instructions carefully and follow them:

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 Question 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

Section A consists of 20 questions of 1 Mark each.

1. HCF of $(2^3 \times 3^2 \times 5)$, $(2^2 \times 3^3 \times 5^2)$ and $(2^4 \times 3 \times 5^3 \times 7)$ is
(a) 60 (b) 48 (c) 30 (d) 105
2. The perimeter of a triangle with vertices $(0, 4)$, $(0, 0)$ and $(3, 0)$ is
(a) 5units (b) 12 units (c) 11 units (d) $(7 + \sqrt{5})$ units
3. A bag has 5 white marbles, 8 red marbles and 4 purple marbles. If we take a marble randomly, then what is the probability of not getting purple marble?
(a) 0.5 (b) 0.66 (c) 0.08 (d) 0.76
4. In what ratio does the x-axis divide the join of $A(2, -3)$ and $B(5, 6)$?
(a) 1 : 2 (b) 3 : 5 (c) 2 : 1 (d) 2 : 3
5. The pairs of equations $9x + 3y + 12 = 0$ and $18x + 6y + 26 = 0$ have
(a) Unique solution (b) Exactly two solutions
(c) Infinitely many solutions (d) No solution
6. Twice the product of the zeroes of the polynomial $23x^2 - 26x + 161$ is $14p$. Find p.
(a) 2 (b) 0 (c) 1 (d) 201
7. If PA and PB are tangents to the circle with center O such that $\angle APB = 40^\circ$, then $\angle OAB$ is equal to



- (a) 40° (b) 30° (c) 20° (d) 25°

8. The least number that is divisible by all the numbers from 1 to 10 (both inclusive) is:

- (a) 10 (b) 100 (c) 504 (d) 2520

9. The mode and mean is given by 7 and 8, respectively. Then the median is:

- (a) $1/13$ (b) $13/3$ (c) $23/3$ (d) 33

10. A sphere of diameter 18 cm is dropped into a cylindrical vessel of diameter 36 cm, partly filled with water. If the sphere is completely submerged then the water level rises by

- (a) 4 cm (b) 5 cm (c) 3 cm (d) 6 cm

11. If $P(E) = 0.07$, then what is the probability of 'not E'?

- (a) 0.93 (b) 0.95 (c) 0.89 (d) 0.90

12. The roots of quadratic equation $2x^2 + x + 4 = 0$ are:

- (a) Positive and negative (b) Both Positive (c) Both Negative (d) No real roots

13. If the zeroes of the quadratic polynomial $x^2 + (a + 1)x + b$ are 2 and -3, then

- (a) $a = -7, b = -1$ (b) $a = 5, b = -1$ (c) $a = 2, b = -6$ (d) $a = 0, b = -6$

14. The value of $(\sin 30^\circ + \cos 60^\circ) - (\sin 60^\circ + \cos 30^\circ)$ is equal to:

- (a) 0 (b) $1 + 2\sqrt{3}$ (c) $1 - \sqrt{3}$ (d) $1 + \sqrt{3}$

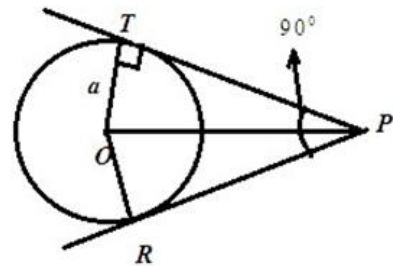
15. Choose the correct option.

$(1 + \tan \theta + \sec \theta)(1 + \cot \theta - \operatorname{cosec} \theta) = \dots\dots\dots$

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

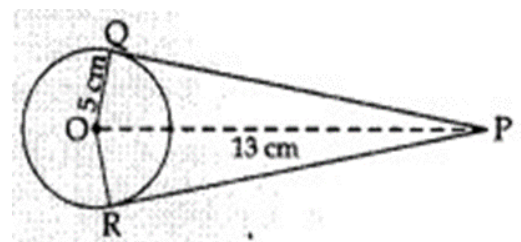
16. If angle between two tangents drawn from a point P to a circle of radius 'a' unit and center 'O' is 90° , then $OP =$

- (a) $2a\sqrt{2}$ units (b) $a\sqrt{2}$ units (c) $a/\sqrt{2}$ units (d) $5a\sqrt{2}$ units



17. From a point P which is at a distance of 13 cm from the center O of a circle of radius 5 cm, the pair of tangents PQ and PR to the circle are drawn. Then the area of the quadrilateral PQOR is:

- (a) 60 cm^2 (b) 65 cm^2 (c) 30 cm^2 (d) 32.5 cm^2



18. If the area of a circle is 154 cm^2 , then its perimeter is

- (a) 11 cm (b) 22 cm (c) 44 cm (d) 55 cm

Direction: In the question number 19 & 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): If the outer and inner diameter of a circular path is 10 m and 6 m then area of the path is 16π m².

Reason (R): If R and r be the radius of outer and inner circular path, then area of path is $\pi (R^2 - r^2)$.

20. Assertion: The mode of the call received on 7 consecutive day 11,13,13,17,19,23,25 is 13.

Reason: Mode is the value that appears most frequent;

SECTION-B

Questions 21 to 25 carry 2 Marks each

21. If the point P (k, 0) divides the line segment joining the points A (2, - 2) and B (- 7, 4) in the ratio 1: 2, then the value of k is?

22. A card is drawn at random from a well shuffled pack of 52 cards. Find the probability of getting (i) a red king (ii) a queen or a jack

OR

Two different dices are tossed together. Find the probability

(a) of getting a Doublet

(b) of getting a sum 10, of the numbers on the two dice.

23. Three bells ring at intervals of 4, 7 and 14 minutes. All three rang at 6 AM. When will they ring together again?

OR

Can the number 6^n , n being a natural number, end with the digit 5? Give reasons.

24. If $\cot \theta = \frac{7}{8}$, then evaluate: $\frac{(1 - \sin \theta)(\sin \theta + 1)}{(1 - \cos \theta)(\cos \theta + 1)}$.

25. Find all possible values of y for which the distance between the points A (2, -3) and B (10, y) is 10 units.

SECTION-C

Questions 26 to 31 carry 3 Marks each

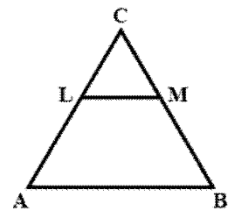
26. Prove that: $\frac{\sin \theta - \cos \theta + 1}{\sin \theta + \cos \theta - 1} = \sec \theta + \tan \theta$

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

28. Find the quadratic polynomial, the sum of whose zeroes is 8 and their product is 12. Hence, find the zeroes of the polynomial.

29. Find the values of k for which the quadratic equation $(k+4)x^2 + (k+1)x + 1 = 0$ has equal roots.

30. In the below figure, LM \parallel AB. If AL = x - 3, AC = 2x, BM = x - 2 and BC = 2x + 3, find the value of x.



OR

D is a point on the side BC of a triangle ABC, such that $\angle ADC = \angle BAC$. Show that $CA^2 = CB \cdot CD$.

31. In a circle of radius 21 cm, an arc subtends an angle of 60° at the center. Find:

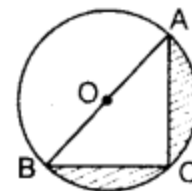
(i) length of the arc.

(ii) area of the sector formed by the arc.

(iii) area of the segment formed by the corresponding chord.

OR

In Figure, O is the Centre of a circle such that diameter AB = 13 cm and AC = 12 cm. BC is joined. Find the area of the shaded region. (Take $\pi = 3.14$)



SECTION-D

Questions 32 to 35 carry 5 Marks each

32. Solve the following system of linear equations graphically: $x + 2y = 3$, $2x - 3y + 8 = 0$

OR

Places A and B are 180 km apart on a highway. One car starts from A and another from B at the same time. If the car travels in the same direction at different speeds, they meet in 9 hours. If they travel towards each other with the same speeds as before, they meet in an hour. What are the speeds of the two cars?

33. From a point P on the ground, the angle of elevation of the top of a 10 m tall building and a helicopter hovering over the top of the building are 30° and 60° respectively. Find the height of the helicopter above the ground.

34. The median of the following data is 52.5. Find the values of x and y. if the total frequency is 100

Class	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Frequency	2	5	x	12	17	20	y	9	7	4

OR

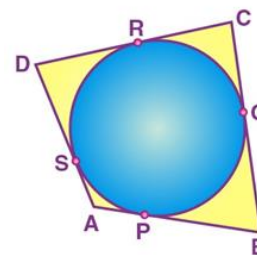
On the sports day of a school, 300 students participated. Their ages are given in the following distribution:

Age (in years)	5-7	7-9	9-11	11-13	13-15	15-17	17-19
Number of students	67	33	41	95	36	13	15

Find the mean and mode of the data.

35. Prove that “The lengths of tangents drawn from an external point to a circle are equal.”

In fig. A quadrilateral ABCD is drawn to circumscribe a circle as shown in the figure. Prove that $AB + CD = AD + BC$.



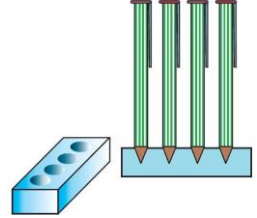
SECTION-E

(Case Study Based Questions) Questions 36 to 38 carry 4 Marks each

36. A pen stand made of wood is in the shape of a cuboid with four conical depressions to hold pens. The dimensions of the cuboid are 15 cm by 10 cm by 3.5 cm. The radius of each of the depressions is 0.5 cm and the depth is 1.4 cm.

Based on the above information, answer the following questions.

- (i) Find the volume of four conical depressions in the entire stand [1]
- (ii) Find the volume of wood in the entire stand [1]
- (iii) Three cubes each of side 15 cm are joined end to end. Find the total surface area of the resulting cuboid. [2]



OR

Two cubes each of volume 64 cm^3 are joined end to end. Find the surface area of the resulting cuboid.

37. Your elder brother wants to buy a car and plans to take loan from a bank for his car. He repays his total loan of Rs. 1,18,000 by paying every month starting with the first instalment of Rs. 1000. If he increases the instalment by Rs. 100 every month.



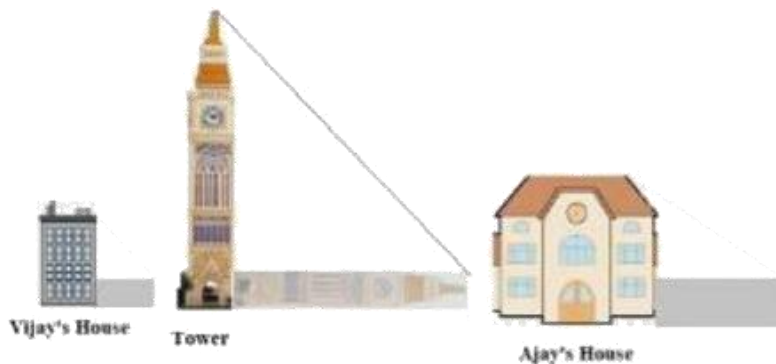
On the basis of above information, answer the following questions.

- (i) What is the amount paid by him in 20th instalment? [1]
- (ii) What is the amount paid by him in 30th instalment? [1]
- (iii) What is the amount paid by him upto 20 instalments? [2]

OR

What is the amount paid by him upto 30 instalments?

38. Vijay is trying to find the average height of a tower near his house. He is using the properties of similar triangles. The height of Vijay's house is 20m when Vijay's house casts a shadow 10m long on the ground. At the same time, the tower casts a shadow 50m long on the ground and the house of Ajay casts 20m shadow on the ground.



Based on
answer

the above information,
the following questions.

- (i) What is the height of the tower? [1]
- (ii) What is the height of Ajay's house? [1]
- (iii) If the height of the tower is 100 m and its shadow is 40 m long, then what will be the length of the shadow of Vijay's house at the same time? [2]

OR

If the height of the tower is 100 m, then what will be the length of the shadow of the tower when Vijay's house casts a shadow of 12 m?