

KENDRIYA VIDYALAYA SANGATHAN JABALPUR REGION
PRE-BOARD- EXAMINATION 2024 -25 SET - A
SUBJECT: MATHEMATICS(BASIC) (241)
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. The value of K for which the equations $3x - y + 8 = 0$ and $6x - ky + 16 = 0$ infinitely solution.
(a) $\frac{1}{2}$ (b) $-\frac{1}{2}$ (c) 2 (d) -2
2. The line segment joining the points $P(-3, 2)$ & $Q(5, 7)$ is divided by the x-axis in the ratio:
(a) 3:1 (b) 3:4 (c) 3:2 (d) 3:5
3. Probability that cannot exist among the following:
(a) $\frac{2}{3}$ (b) -2.5 (c) 25% (d) 0.7
4. The distance between the points (0, 5) and (-5, 0) is-
(a) 5 units (b) $5\sqrt{2}$ units (c) $2\sqrt{5}$ units (d) 10 units
5. The pairs of equations $9x + 3y + 11 = 0$ and $18x + 5y + 26 = 0$ have
(a) Unique solution (b) Exactly two solutions (c) Infinitely many solutions (d) No solution
6. Find the quadratic polynomial whose zeros are -3 and 4.
(a) $x^2 - 7x - 12$ (b) $x^2 + x + 12$ (c) $x^2 - x - 12$ (d) $x^2 + 3x - 4$
7. If two tangents inclined at an angle 60° are drawn to a circle of radius 3 cm, then length of each tangent is equal to
(a) $\frac{3}{2}\sqrt{3}$ cm (b) 6 cm (c) 3 cm (d) $3\sqrt{3}$ cm
8. If $p-1$, $p+1$ and $2p+3$ are in AP, then the value of p is
(a) 4 (b) 0 (c) -2 (d) 2
9. The mode and mean is given by 7.6 and 8.5, respectively. Then the median is:
(a) 8.2 (b) 3.8 (c) 8.6 (d) 3.3

10. A right circular cylinder its curved surface area is 176 cm^2 and it has a radius of 4cm then find the height of the cylinder?

- (a) 5cm (b) 16 cm (c) 8 cm (d) 7 cm

11. A die is rolled once. The probability that the obtained number is more than 5, is

- (a) $\frac{5}{6}$ (b) $\frac{1}{6}$ (c) $\frac{2}{3}$ (d) $\frac{1}{3}$

12. From a well-shuffled deck of 52 playing cards, a card is drawn at random. What is the probability of getting a red queen?

- (a) $\frac{1}{52}$ (b) $\frac{1}{26}$ (c) $\frac{1}{13}$ (d) $\frac{12}{13}$

13. The discriminant of the quadratic equation $2x^2 - 5x - 3 = 0$

- (a) 1 (b) 49 (c) 7 (d) 19

14. If $p(x) = x^2 + 5x + 6$, then $p(-2)$ is:

- (a) 20 (b) 0 (c) -8 (d) 8

15. If $\text{Cosec } A = \frac{7}{5}$, then value of $\tan A \cdot \cos A$ is :

- (a) $\frac{7}{5}$ (b) $\frac{2\sqrt{6}}{5}$ (c) $\frac{24}{49}$ (d) $\frac{5}{7}$

16. The length of tangents drawn from an external point to the circle

- (a) are equal (b) are not equal (c) sometimes are equal (d) are not defined

17. The length of a tangent drawn from a point at a distance of 10 cm of circle is 8 cm. The radius of the circle is

- (a) 4 cm (b) 5 cm (c) 6 cm (d) 7 cm

18. If the perimeter of a circle is 22 cm, then its area

- (a) 112 cm^2 (b) 225 cm^2 (c) 145 cm^2 (d) 154 cm^2

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 8 m and 6 m then area of the path is 22 m^2 .

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:** If the value of mode and mean is 7 and 8 respectively, then the value of median is $\frac{23}{3}$.

Reason: Median = $\frac{(\text{mode} + 2\text{mean})}{2}$

SECTION-B

Questions 21 to 25 carry 2 Marks each

21. If the point P (6, 2) divides the line segment joining A (6, 5) and B (4, y) in the ratio 3: 1, then the value of y is?

22. A card is drawn at random from a well shuffled pack of 52 cards. Find the probability of getting

- (i) a black king (ii) a king or a jack

OR

Two different dices are tossed together. Find the probability of

- (i) getting a Doublet

- (i) getting a sum 9, of the numbers on the two dice.

23. If two positive integers a and b are written as $a = x^3y^2$ and $b = x y^3$. where x, y are Prime numbers, then find HCF (a, b).

OR

Explain why $7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 + 5$ are composite numbers.

24. Evaluate $\sin 60^\circ \cos 30^\circ + \sin 30^\circ \cos 60^\circ$

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 $2 + 3\sqrt{3}$ is an irrational number. It is given that $\sqrt{3}$ is an irrational number.

27. Find the zeroes of the quadratic polynomial $x^2 + 6x + 8$ and verify the relationship between the zeroes and the coefficients.

28. A train travels a distance of 480 km at a uniform speed. If the speed had been 8 km/h less, then it would have taken 3 hours more to cover the same distance. We need to find the speed of the train.

29. Prove that: $(\sin A + \operatorname{cosec} A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A$

30. ABCD is a trapezium in which $AB \parallel DC$ and its diagonals intersect each other at the point O. Show that $\frac{AO}{BO} = \frac{CO}{DO}$

OR

E is a point on the side AD produced of a parallelogram ABCD and BE intersects CD at F.

Show that $\triangle ABE \sim \triangle CFB$.

31. Find the area of the sector of a circle with radius 4 cm and of angle 30° . Also, find the area of the corresponding major sector (Use $\pi = 3.14$).

OR

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

SECTION-D

Questions 32 to 35 carry 5 Marks each

32. Draw the graphs of the equations $x - y + 1 = 0$ and $3x + 2y - 12 = 0$. Determine the coordinates of the vertices of the triangle formed by these lines and the x-axis, and shade the triangular region.

OR

The sum of a two-digit number and the number obtained by reversing the digits is 66. If the digits of the number differ by 2, find the number. How many such numbers are there?

33. Two poles of equal heights are standing opposite each other on either side of the road, which is 80 m wide. From a point between them on the road, the angles of elevation of the top of the poles are 60° and 30° , respectively. Find the height of the poles and the distances of the point from the poles.

34. If the median of the distribution given below is 28.5, find the values of x and y . if the total frequency is 60.

Class	0-10	10-20	20-30	30-40	40-50	50-60
Frequency	5	x	20	15	y	5

OR

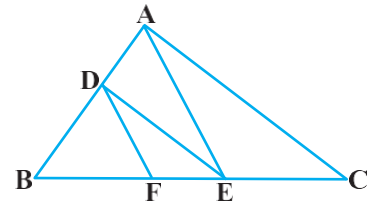
The following table shows the ages of the patients admitted in a hospital during a year:

Age (in years)	5-15	15-25	25-35	35-45	45-55	55-65
Number of students	6	11	21	23	14	5

Find the mode and the mean of the data given above. Compare and interpret the two measures of central tendency.

35. (i) Prove that “If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratios”.

(ii) In Fig., $DE \parallel AC$ and $DF \parallel AE$. Prove that $\frac{BF}{FE} = \frac{BE}{EC}$



SECTION-E

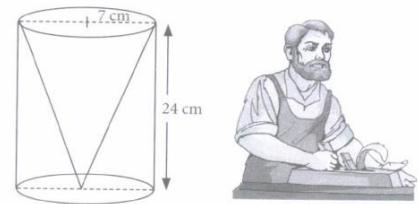
(Case Study Based Questions) Questions 36 to 38 carry 4 Marks each

36. One day Rinku was going home from school, saw a carpenter working on wood. He found that he is carving out a cone of same height and same diameter from a cylinder. The height of the cylinder is 24 cm and base radius is 7 cm. While watching this, some questions came into Rinku's mind. Help Rinku to find the answer of the following questions.

(i) Find the slant height of the conical cavity so formed. [1]

(ii) Find the curved surface area of the conical cavity so formed. [1]

(iii) Find the external curved surface area of the cylinder. [2]



OR

Calculate the Volume of conical cavity. [2]

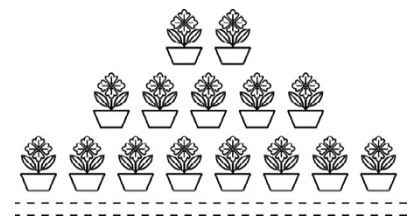
37. Tanishka being a plant lover decides to convert her balcony into beautiful garden full of plants. She bought few plants with pots for her balcony. She placed the pots in such a way that number of pots in the first row is 2, second row is 5, third row is 8 and soon.

Based on the above information answer the following questions:

(i) Find the number of pots placed in the 10th row. [1]

(ii) Find the difference in the number of pots placed in 5th row and 2nd row. [1]

(iii) If Tanishka wants to place 100 pots in total, then find the total number of rows formed in the arrangement. [2]



OR

If Tanishka has sufficient space for 12 rows, then how many total numbers of pots are placed by her with the same arrangement? [2]

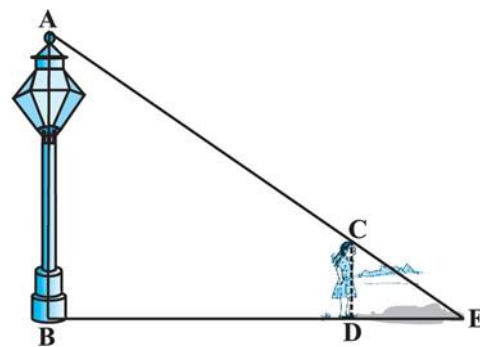
38. A group of school students are walking in the park. One of them a girl of height 90 cm is walking away from the base of a lamp-post at a speed of 1.2 m/s. If the lamp is 3.6 m above the ground,

Based on the above information answer the following questions:

(i) Find the distance of girl from the lamp post. [BD] [1]

(ii) Find the length of her shadow after 4 seconds. [1]

(iii) Find the ratio of height of girl and lamp post. $\frac{CD}{AB}$ [2]



OR

Find the distance of end of shadow point from the lamp post [BE] [2]