



Class X

SESSION : 2023-2024

SUBJECT: MATHEMATICS

Maximum Marks: 50 Marks

Time Allowed: 1 hours 45 min

General Instructions:

1. This Question Paper has 5 Sections A-E.
2. Section A has 20 MCQs carrying 1 mark each, Section B has 5 questions carrying 02 marks each, Section C has 2 questions carrying 03 marks each, Section D has 2 questions carrying 05 marks each & Section E has 1 case based integrated units of assessment (04 marks each) with subparts of the values of 1, 1 and 2 marks each respectively.
3. All Questions are compulsory.
4. Use of any electronic gadgets during exam are prohibited.

Section A

Q1) If the system of equations $3x+y=1$ and $(2k-1)x+(k-1)y=2k+1$ is inconsistent, then $k =$

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

Q2) If the vertices of a parallelogram PQRS taken in order are $P(3,4)$, $Q(-2,3)$ and $R(-3,-2)$, then the coordinates of its fourth vertex S are

- (a) $(-2,-1)$ (b) $(-2,-3)$
(c) $(2,-1)$ (d) $(1,2)$

Q3) If the difference of Mode and Median of a data is 24, then the difference of median and mean is

- (a) 8 (b) 12
(c) 24 (d) 36

Q4) The perimeter of a triangle with vertices $(0, 4)$, $(0, 0)$ and $(3, 0)$ is

(a) 5 units (b) 12 units (c) 11 units (d) $(7 + \sqrt{5})$ units

Q5) Graphically, the pair of equations given by

$$6x - 3y + 10 = 0$$

$$2x - y + 9 = 0$$

represents two lines which are

- (a) intersecting at exactly one point. (b) parallel.
(c) coincident. (d) intersecting at exactly two points.

Q6) In which ratio the y-axis divides the line segment joining the points $(5, -6)$ and $(-1, -4)$?

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

Q7) If a pair of linear equations is consistent, then the lines will be

- (a) always coincident (b) parallel
(c) always intersecting (d) intersecting or coincident

Q8) The pair of equations $x = 0$ and $x = 5$ has

- (a) no solution (b) unique/one solution
(c) two solutions (d) infinitely many solutions

Q9) If $(a/3, 4)$ is the mid-point of the segment joining the points $P(-6, 5)$ and $R(-2, 3)$, then the value of 'a' is

- (a) 12 (b) -6
(c) -12 (d) -4

Q10) The coordinates of the centroid of a triangle whose vertices are $(0, 6)$, $(8, 12)$ and $(8, 0)$ is

- (a) $(4, 6)$ (b) $(16, 6)$
(c) $(8, 6)$ (d) $(16/3, 6)$

Q11) The area of a circle whose circumference is 22 cm, is

- (a) 11 cm^2
(b) 38.5 cm^2
(c) 22 cm^2
(d) 77 cm^2

Q12) The area of the circle that can be inscribed in a square of side 6 cm, is

- (a) $18\pi \text{ cm}^2$
(b) $12\pi \text{ cm}^2$
(c) $9\pi \text{ cm}^2$
(d) $14\pi \text{ cm}^2$

Q13) If the area of a circle is numerically equal to twice its circumference, then the diameter of the circle is

- (a) 4 units
- (b) n units
- (c) 8 units
- (d) 2 units

Q14) Three farmers have 490 kg, 588 kg and 882 kg of wheat respectively. Find the maximum capacity of a bag so that the wheat can be packed in exact number of bags.

- (a) 98 kg
- (b) 290 kg
- (c) 200 kg
- (d) 350 kg

Q15) If the HCF of 408 and 1032 is expressible in the form $1032 \times 2 + 408 \times p$, then the value of p is

- (a) 5
- (b) -5
- (c) 4
- (d) -4

Q16) If $\text{HCF}(16, y) = 8$ and $\text{LCM}(16, y) = 48$, then the value of y is

- (a) 24
- (b) 16
- (c) 8
- (d) 48

Q17) One of the methods for determining mode is

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

Q18) The equation $(x - 2)^2 + 1 = 2x - 3$ is a

- (a) linear equation
- (b) quadratic equation
- (c) cubic equation
- (d) bi-quadratic equation

DIRECTION: In the question number 19 and 20, a statement of assertion (A) is

followed by a statement of Reason (R).

Choose the correct option

Q19) Statement A (Assertion): If product of two numbers is 5780 and their HCF is 17, then their LCM is 340

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

- (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.

Q20) Statement A (Assertion): If the co-ordinates of the mid-points of the sides AB and AC of ΔABC are D(3,5) and E(-3,-3) respectively, then $BC = 20$ units

Statement R(Reason) : The line joining the mid points of two sides of a triangle is parallel to the third side and equal to half of it.

- (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.

Section B

Q21) For what values of k will the following pair of linear equations have infinitely many solutions?

$$kx + 3y - (k - 3) = 0$$

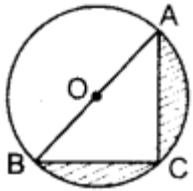
$$12x + ky - k = 0$$

Q22) If $49x + 51y = 499$, $51x + 49y = 501$, then find the value of x and y

Q23) ABCD is a rectangle whose three vertices are B(4, 0), C(4, 3) and D(0, 3). Calculate the length of one of its diagonals.

Q24) Find the ratio in which the point P($\frac{3}{4}, \frac{5}{12}$) divides the line segment joining the points A($\frac{1}{2}, \frac{3}{2}$) and B(2, -5).

Q25) 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 C

Q26) Prove that $5 + 2\sqrt{3}$ is irrational.

Q27) A shopkeeper gives books on rent for reading. She takes a fixed charge for the first two days, and an additional charge for each day thereafter. Latika paid Rs 22 for a book kept for six days, while Anand paid Rs 16 for the book kept for four days. Find the fixed charges and the charge for each extra day.

Section D

Q28) A life insurance agent found the following data for distribution of ages of 100 policy holders. Calculate the median age, if policies are given only to persons having age 18 years onwards but less than 60 years.

Age (in years)	Number of policy holders
Below 20	2
20-25	4
25-30	18
30-35	21
35-40	33
40-45	11
45-50	3
50-55	6
55-60	2

Q29) Heights of students of class X are given in the following frequency distribution:

Height (in cm)	Number of students
150-155	15
155-160	8
160-165	20
165-170	12
170-175	5

Find the modal height.

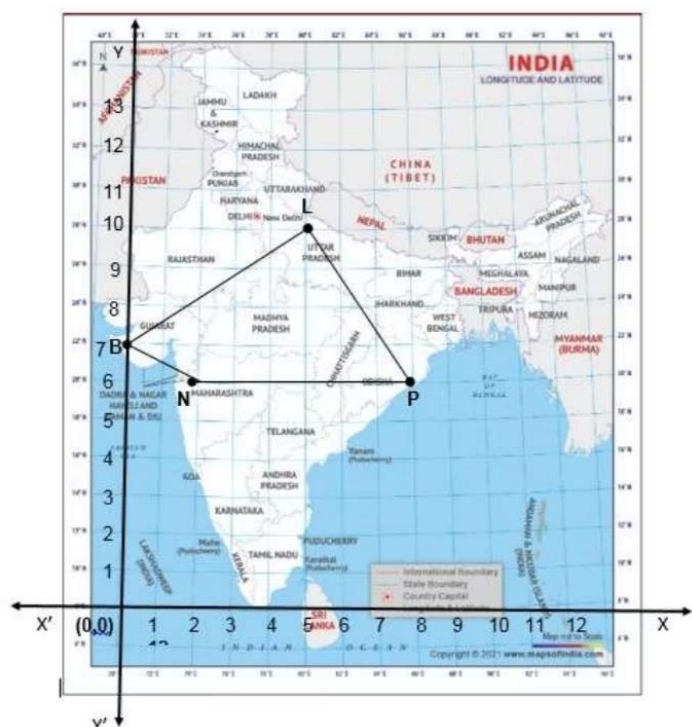
Section E

Case study based questions are compulsory

Q30) Case Study

In a GPS, The lines that run east-west are known as lines of latitude, and the lines running north-south are known as lines of longitude. The latitude and the longitude of a place are its coordinates and the distance formula is used to find the distance between two places. The distance between two parallel lines is approximately 150 km. A family from Uttar Pradesh planned a round trip from Lucknow (L) to Puri (P) via Bhuj (B) and Nashik (N) as shown in the given figure below. Based on the above information answer the following questions using the coordinate geometry.

I	Find the distance between Lucknow (L) to Bhuj(B).	1
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II	If Kota (K), internally divide the line segment joining Lucknow (L) to Bhuj (B) into 3 : 2 then find the coordinate of Kota (K).	1
III	Name the type of triangle formed by the places Lucknow (L), Nashik (N) and Puri (P) [OR] Find a place (point) on the longitude (y-axis) which is equidistant from the points Lucknow (L) and Puri (P).	2

1.



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