



B.K. BIRLA CENTRE FOR EDUCATION

SARALA BIRLA GROUP OF SCHOOLS
A CBSE DAY-CUM-BOYS' RESIDENTIAL SCHOOL

PRE MID TERM (2026-27) MATHEMATICS SET-A

Class: X

Duration: 1 Hr

Date: 20.07.26

Max. Marks: 25

Admission No: _____

Roll No.: _____

SECTION A | Multiple Choice Questions (1 mark each)

1. A staircase in a heritage monument has 15 steps. The first step is 20 cm high and each subsequent step is 1.5 cm higher than the previous one. A visitor wonders: what is the total height climbed after ascending ALL 15 steps?
(a) 457.5 cm (b) 450.0 cm (c) 465.0 cm (d) 442.5 cm
2. Reena saves money every week. In the 1st week she saves Rs. 5, in the 2nd week Rs. 8, in the 3rd week Rs. 11, and so on. After how many weeks will her TOTAL savings first exceed Rs. 500?
(a) 17 weeks (b) 18 weeks (c) 16 weeks (d) 19 weeks
3. On a city map drawn on a coordinate grid, a hospital H is at (1, 5) and a school S is at (7, -3). An ambulance depot A must be located at a point that divides HS in the ratio 1 : 2 internally. What are the coordinates of A?
(a) (3, 7/3) (b) (5, 1/3) (c) (3, 7/3) (d) (3, 1/3)
4. Three mobile towers are installed at P(0, 0), Q(6, 0) and R(3, $3\sqrt{3}$). A maintenance engineer claims the towers form an equilateral triangle. Which of the following confirms this?
(a) All angles are 60 deg (b) $PQ = QR = PR = 6$ units
(c) Midpoints coincide (d) Area = 18 sq. units
5. A drone flies from A(2, 3) to B(8, 3) and then to C(8, 9). The pilot wants to fly directly from A to C next time. What is the ratio of the direct distance AC to the total path distance AB + BC?
(a) 1 : 2 (b) $(3\sqrt{2}) : 12$ (c) $(6\sqrt{2}) : 12$ (d) 1 : $\sqrt{2}$

Directions: Read both statements carefully and choose the correct option.

- (a) Both A and R are true and R is the correct explanation of A.
 (b) Both A and R are true but R is NOT the correct explanation of A.
 (c) A is true but R is false.
 (d) A is false but R is true.

6. **Assertion (A):** The sum of the first 10 odd natural numbers is 100. 1
Reason (R): The sum of the first n odd natural numbers equals n^2 .

SECTION B | Short Answer (2 marks)

7. A bamboo plant grows 8 cm in the first week after planting. It grows 3 cm less each subsequent week (i.e., 5 cm in week 2, 2 cm in week 3, and stops growing when height increment is zero or negative). 2
 (i) Find the number of weeks the plant actively grows.
 (ii) What total height does the plant add due to this growth pattern?
8. Two friends, Aryan and Bhavna, live at A(4, -1) and B(-2, 5) respectively. They plan to meet at a coffee shop C that is equidistant from both their homes and also lies on the x-axis. Find the coordinates of C. 2

SECTION C | Short Answer (3 marks)

9. A garden in the shape of a quadrilateral has vertices at W(1, 2), X(4, 6), Y(7, 4) and Z(4, 0). Using the section formula, verify whether the diagonals bisect each other (i.e., whether WXYZ is a parallelogram). 3
10. A school organises chairs for its Annual Day. The first row has 10 chairs, and each subsequent row has 4 more chairs than the previous row. The auditorium has a maximum capacity of 500 chairs. 3
 (i) How many chairs are in the 12th row?
 (ii) What is the maximum number of complete rows that can be arranged within the capacity?
 (iii) If the organiser wants exactly 400 chairs, find the number of rows needed. Justify your answer.

SECTION D | Long Answer (5 marks)

11. A town planner marks four community centres on a coordinate grid: P(-2, 1), Q(4, 3), R(6, -1) and S(0, -3).
 (i) Show that PQRS is a rectangle.
 (ii) Find the length of the diagonals PR and QS, and confirm they are equal.
 (iii) A central park is to be built at the intersection of the diagonals. Find its coordinates.
 (iv) A fifth centre T is to be placed such that T divides QS externally in the ratio 3 : 1. Find the coordinates of T.

SECTION E | Competency-Based Case Study (4 marks)

- 12 4

DRIP IRRIGATION PLANNING



A farmer installs a drip irrigation system. On Day 1, the pump releases 150 litres of water. Due to increasing crop demand, the release increases by 10 litres each day.

- (i) How much water is released on Day 15?
- (ii) The farmer has a storage tank of 6000 litres. After how many days will the cumulative water released equal or exceed the tank's capacity?
- (iii) The farmer notices that on a certain day the release was exactly double the Day 1 release. Which day is this?
- (iv) If the pump malfunctions and from Day 11 onwards releases 50 litres LESS than what it would have, find the total water released in the first 20 days.