

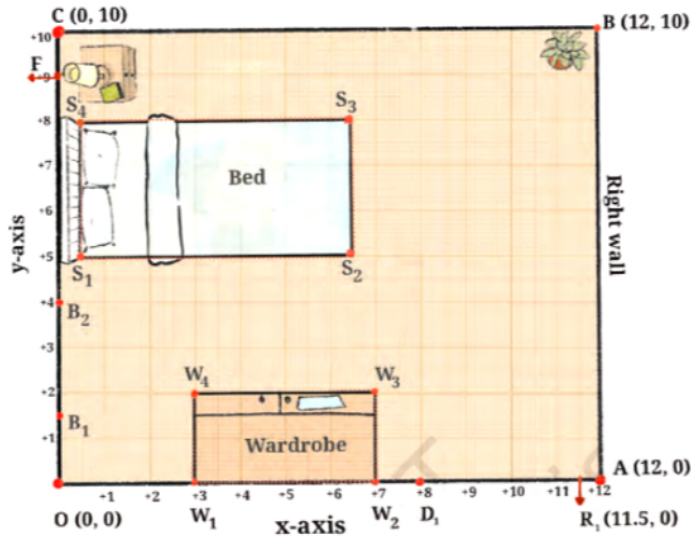
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CORDINATE GEOMETRY
Class 09 - Maths (Ganita Manjari)

Time Allowed: 1 hour

Maximum Marks: 93

1. Figure shows Reiaan's room with points OABC marking its corners. The x- and y-axes are marked in the figure. Point O is the origin. [5]

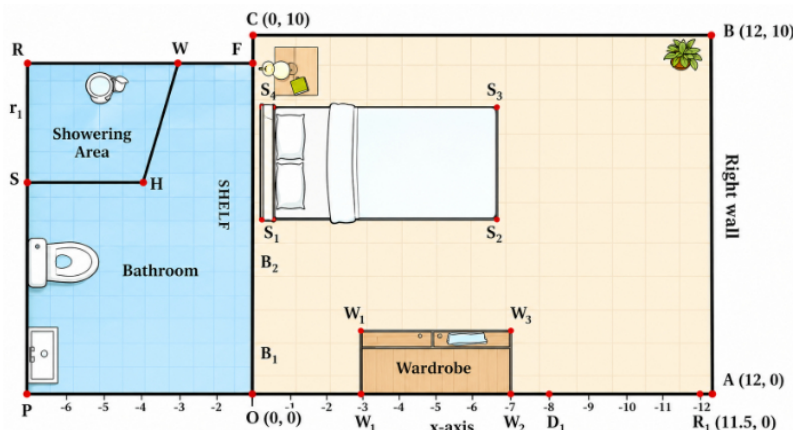


- i. If D_1R_1 represents the door to Reiaan's room, how far is the door from the left wall (the y-axis) of the room? How far is the door from the x-axis? **(1)**
- ii. What are the coordinates of D_1 ? **(1)**
- iii. If R_1 is the point $(11.5, 0)$, how wide is the door? Do you think this is a comfortable width for the room door? If a person in a wheelchair wants to enter the room, will he/she be able to do so easily? **(2)**

OR

If $B_1(0, 1.5)$ and $B_2(0, 4)$ represent the ends of the bathroom door, is the bathroom door narrower or wider than the room door? **(2)**

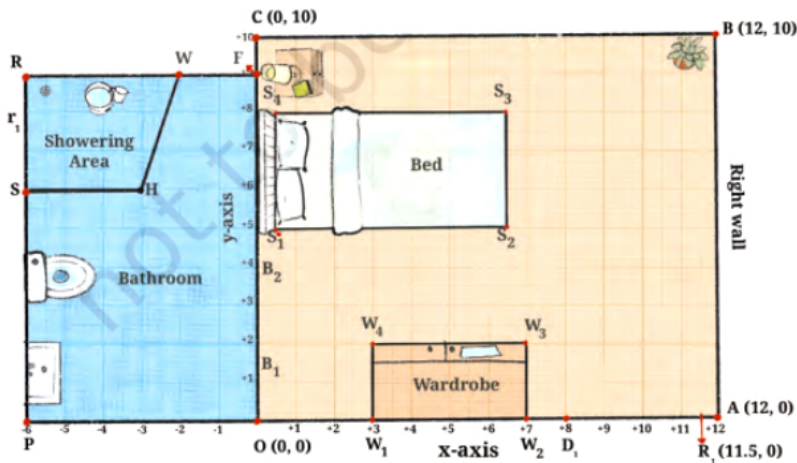
2. On a graph sheet, mark the x-axis and y-axis and the origin O. Mark points from $(-7, 0)$ to $(13, 0)$ on the x-axis and from $(0, -15)$ to $(0, 12)$ on the y-axis. (Use the scale $1\text{ cm} = 1\text{ unit}$.) [5]
 Using Figure, answer the given question-



Place Reiaan's rectangular study table with three of its feet at the points $(8, 9)$, $(11, 9)$ and $(11, 7)$.

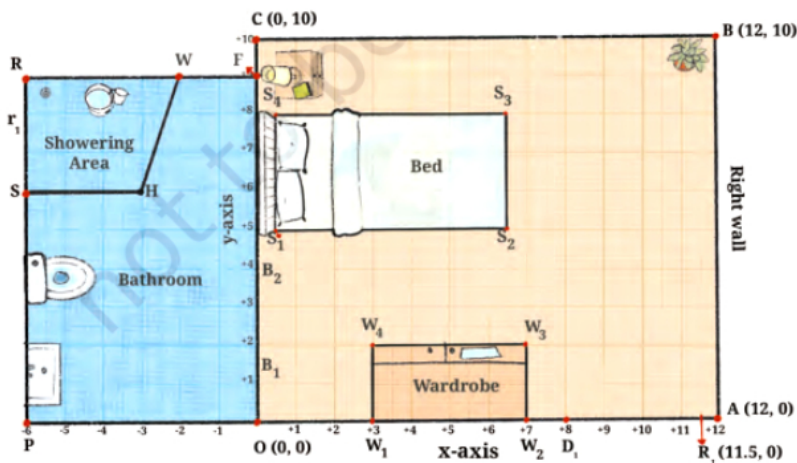
- Where will the fourth foot of the table be?
- Is this a good spot for the table?
- What is the width of the table? The length? Can you make out the height of the table?

3. On a graph sheet, mark the x -axis and y -axis and the origin O . Mark points from $(-7, 0)$ to $(13, 0)$ on the x -axis and from $(0, -15)$ to $(0, 12)$ on the y -axis. (Use the scale $1\text{ cm} = 1$ unit.) [3]
Using Figure, answer the given question-



If the bathroom door has a hinge at B_1 and opens into the bedroom, will it hit the wardrobe? Are there any changes you would suggest if the door is made wider?

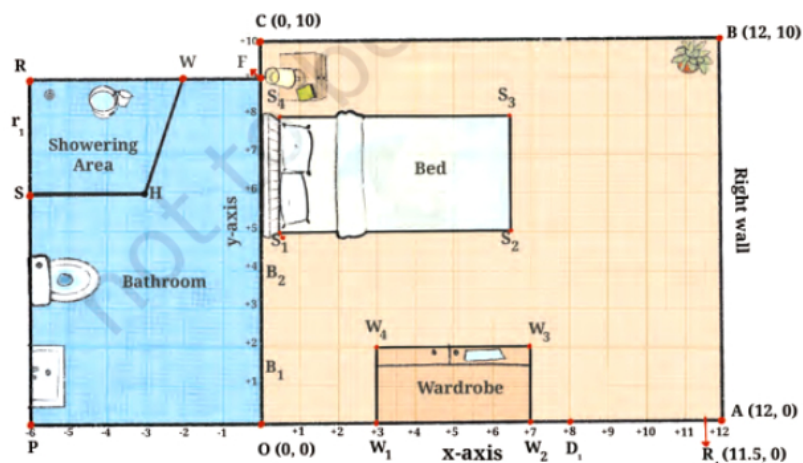
4. On a graph sheet, mark the x -axis and y -axis and the origin O . Mark points from $(-7, 0)$ to $(13, 0)$ on the x -axis and from $(0, -15)$ to $(0, 12)$ on the y -axis. (Use the scale $1\text{ cm} = 1$ unit.) [5]
Using Figure, answer the given question-



Look at Reiaan's bathroom.

- What are the coordinates of the four corners O , F , R , and P of the bathroom?
- What is the shape of the showering area $SHWR$ in Reiaan's bathroom? Write the coordinates of the four corners.
- Mark off a $3\text{ ft} \times 2\text{ ft}$ space for the washbasin and a $2\text{ ft} \times 3\text{ ft}$ space for the toilet. Write the coordinates of the corners of these spaces.

5. On a graph sheet, mark the x -axis and y -axis and the origin O . Mark points from $(-7, 0)$ to $(13, 0)$ on the x -axis and from $(0, -15)$ to $(0, 12)$ on the y -axis. (Use the scale $1\text{ cm} = 1$ unit.) [3]
Using Figure, answer the given question-



Other rooms in the house:

- i. Reiaan's room door leads from the dining room which has the length 18 ft and width 15 ft. The length of the dining room extends from point P to point A. Sketch the dining room and mark the coordinates of its corners.
- ii. Place a rectangular $5\text{ft} \times 3\text{ft}$ dining table precisely in the centre of the dining room. Write down the coordinates of the feet of the table.

6. What are the x-coordinate and y-coordinate of the point of intersection of the two axes? **[2]**
7. Point W has x-coordinate equal to -5. Can you predict the coordinates of point H which is on the line through W parallel to the y-axis? Which quadrants can H lie in? **[2]**
8. Consider the points $R(3, 0)$, $A(0, -2)$, $M(-5, -2)$ and $P(-5, 2)$. If they are joined in the same order, predict: **[5]**
 - i. Two sides of RAMP that are perpendicular to each other.
 - ii. One side of RAMP that is parallel to one of the axes.
 - iii. Two points that are mirror images of each other in one axis. Which axis will this be?

Now plot the points and verify your predictions.

9. Plot point $Z(5, -6)$ on the Cartesian plane. Construct a right-angled triangle IZN and find the lengths of the three sides. **[3]**
(Comment: Answers may differ from person to person.)
10. What would a system of coordinates be like if we did not have negative numbers? Would this system allow us to locate all the points on a 2-D plane? **[3]**
11. Are the points $M(-3, -4)$, $A(0, 0)$ and $G(6, 8)$ on the same straight line? Suggest a method to check this without plotting and joining the points. **[3]**
12. Use your method (from Problem 6) to check if the points $R(-5, -1)$, $B(-2, -5)$ and $C(4, -12)$ are on the same straight line. Now plot both sets of points and check your answers. **[3]**
13. Using the origin as one vertex, plot the vertices of: **[5]**
 - i. A right-angled isosceles triangle.
 - ii. An isosceles triangle with one vertex in Quadrant III and the other in Quadrant IV.
14. Use the connection you found to find the coordinates of B given that $M(-7, 1)$ is the midpoint of $A(3, -4)$ and $B(x, y)$. **[3]**
15. Let P, Q be points of trisection of AB, with P closer to A, and Q closer to B. Using your knowledge of how to find the coordinates of the midpoint of a segment, how would you find the coordinates of P and Q ? Do this for the case when the points are $A(4, 7)$ and $B(16, -2)$. **[3]**

16. i. Given the points $A(1, -8)$, $B(-4, 7)$ and $C(-7, -4)$, show that they lie on a circle K whose center is the origin $O(0, 0)$. What is the radius of circle K ? [5]
 ii. Given the points $D(-5, 6)$ and $E(0, 9)$, check whether D and E lie within the circle, on the circle, or outside the circle K .
17. The midpoints of the sides of triangle ABC are the points D , E , and F . Given that the coordinates of D , E , and F are $(5, 1)$, $(6, 5)$, and $(0, 3)$, respectively, find the coordinates of A , B and C . [5]
18. A city has two main roads which cross each other at the centre of the city. These two roads are along the North-South (N-S) direction and East-West (E-W) direction. All the other streets of the city run parallel to these roads and are 200 m apart. There are 10 streets in each direction. [5]
 i. Using $1 \text{ cm} = 200 \text{ m}$, draw a model of the city in your notebook. Represent the roads/streets by single lines.
 ii. There are street intersections in the model. Each street intersection is formed by two streets—one running in the $N - S$ direction and another in the E-W direction. Each street intersection is referred to in the following manner: If the second street running in the N-S direction and 5th street in the E-W direction meet at some crossing, then we call this street intersection $(2,5)$. Using this convention, find:
 a. how many street intersections can be referred to as $(4, 3)$.
 b. how many street intersections can be referred to as $(3, 4)$.
19. A computer graphics program displays images on a rectangular screen whose coordinate system has the origin at the bottom-left corner. The screen is 800 pixels wide and 600 pixels high. A circular icon of radius 80 pixels is drawn with its centre at the point $A(100, 150)$. Another circular icon of radius 100 pixels is drawn with its centre at the point $B(250, 230)$. Determine: [3]
 i. whether any part of either circle lies outside the screen.
 ii. whether the two circles intersect each other.
20. Plot the points $A(2, 1)$, $B(-1, 2)$, $C(-2, -1)$, and $D(1, -2)$ in the coordinate plane. Is $ABCD$ a square? Can you explain why? What is the area of this square? [5]
21. What is the x -coordinate of a point on the y -axis? [3]
22. Is there a similar generalization for a point on the x -axis? [3]
23. Does point $Q(y, x)$ ever coincide with point $P(x, y)$? Justify your answer. [3]
24. If $x \neq y$, then $(x, y) \neq (y, x)$; and $(x, y) = (y, x)$ if and only if $x = y$. Is this claim true? [3]
25. In moving from $A(3, 4)$ to $D(7, 1)$, what distance has been covered along the x -axis? What about the distance along the y -axis? [2]
26. Would these observations be the same if $\triangle ADM$ is reflected in the x -axis (instead of the y -axis)? [3]