



2027

15th

Orienting Yourself: The Use of Coordinates

Lecture - 05

CLASS-9TH

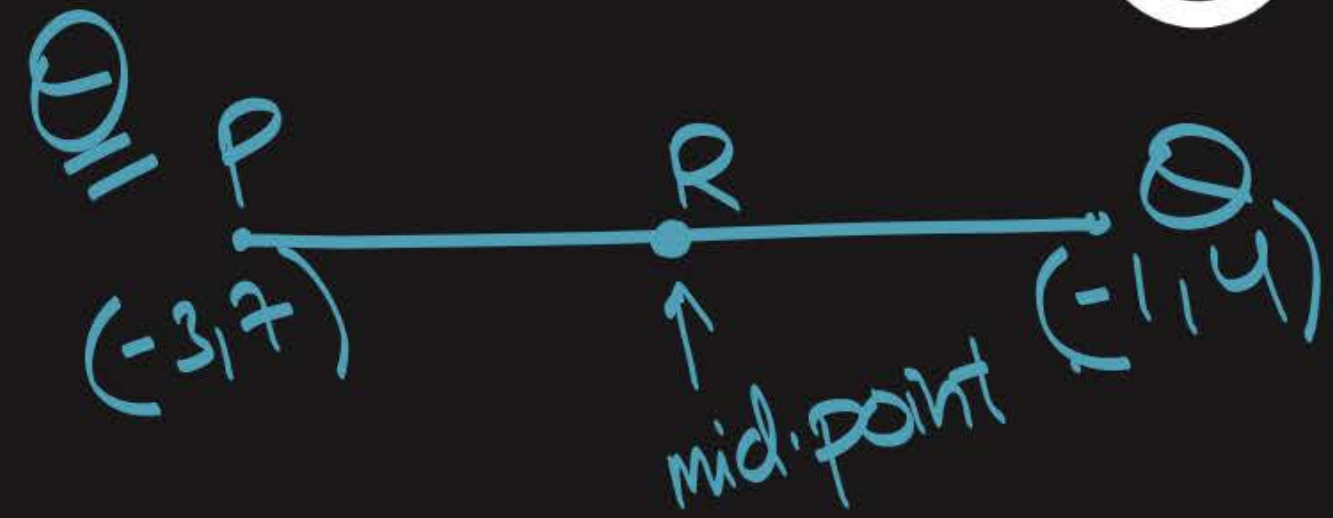
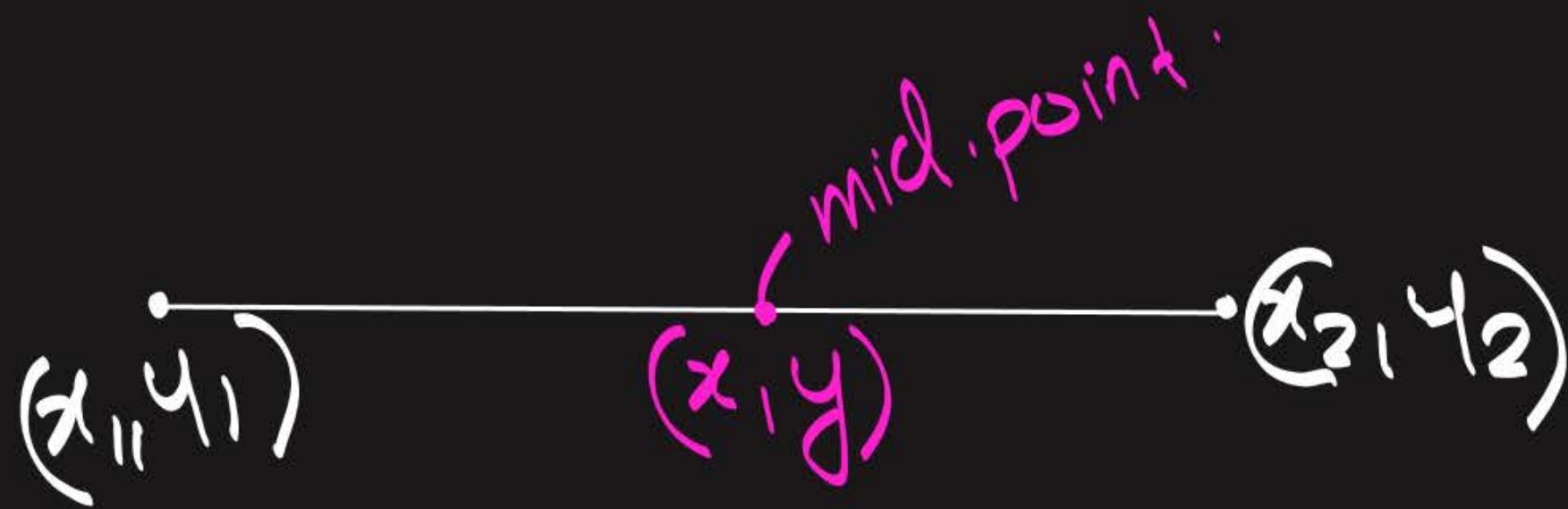
MATHS

Ritik Sir



Topics To Be Covered

- 1 Badhiya questions of NCERT.



$$x = \frac{x_1 + x_2}{2}$$

$$y = \frac{y_1 + y_2}{2}$$

$$R\left(\frac{-3 + -1}{2}, \frac{7 + 4}{2}\right)$$

$$R\left(-2, \frac{11}{2}\right)$$

$$R(-2, \frac{11}{2})$$

S.S.

#CTR

$$\underline{a + b = 4}$$

$$a = 4 - b$$

$$a = 4$$

$$2a + 6b = 8$$

$$2(4 - b) + 6b = 8$$

$$8 - 2b + 6b = 8$$

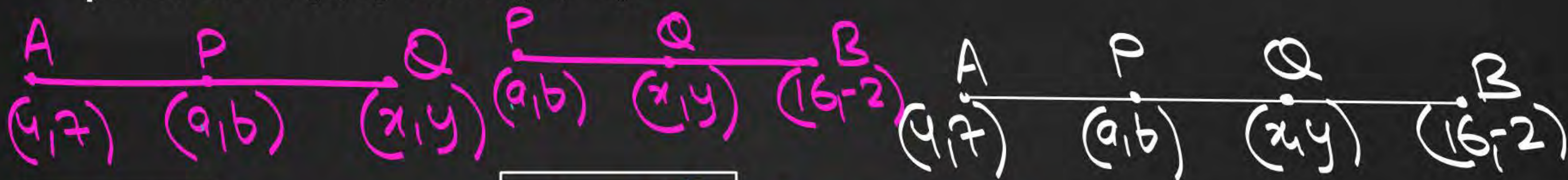
$$4b = 0$$

$$b = 0$$

QUESTIONS



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).



$$a = \frac{4+x}{2}$$

$$2a = 4+x$$

$$2a - 4 = x$$

$$x = \frac{a+16}{2}$$

$$2x = a+16$$

$$2(2a-4) = a+16$$

$$4a-8 = a+16$$

$$3a = 24$$

$$a = 8$$

$$b = \frac{7+y}{2}$$

$$2(8) - 4 = x$$

$$12 = x$$

$$y = \frac{b-2}{2}$$

$$a - \frac{4+x}{2}$$

$$2a = 4 + x$$

$$2a - 4 = x$$

$$2(8) - 4 = x$$

$$16 - 4 = x$$

$$12 = x$$

$$x = \frac{a+16}{2}$$

$$2x = a + 16$$

$$2(2a - 4) = a + 16$$

$$4a - 8 = a + 16$$

$$4a - a = 16 + 8$$

$$3a = 24$$

$$a = 24/3$$

$$a = 8$$

$$b = \frac{7+y}{2}$$

$$2b = 7+y$$

$$2b - 7 = y$$

$$2(4) - 7 = y$$

$$1 = y$$

$$y = \frac{b-2}{2}$$

$$2y = b-2$$

$$2(2b-7) = b-2$$

$$4b-14 = b-2$$

$$4b-b = -2+14$$

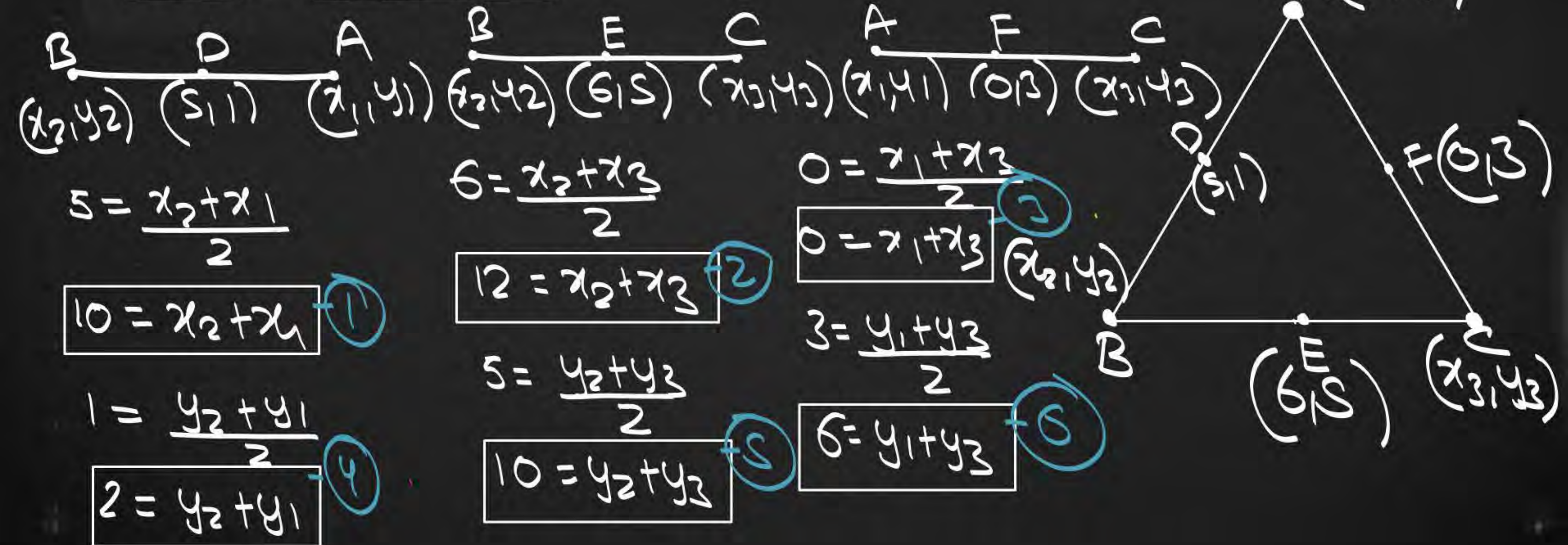
$$3b = 12$$

$$b = 4$$

• P(8,4) Ans
• Q(12,1)

QUESTIONS

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.



$$y_2 + y_1 = 2$$

$$y_2 + y_3 = 10$$

$$y_1 + y_3 = 6$$

$$y_2 = 10 - y_3$$

$$y_2 = 10 - 7 = 3$$

$$y_1 = 6 - y_3$$

$$y_1 = 6 - 7 = -1$$

$$\rightarrow (10 - y_3) + (6 - y_3) = 2$$

$$10 - y_3 + 6 - y_3 = 2$$

$$-2y_3 + 16 = 2$$

$$-2y_3 = -14$$

$$y_3 = -14 / -2$$

$$y_3 = 7$$

$$x_2 + x_1 = 10 \rightarrow x_2 = 10 - x_1 \rightarrow x_2 = 10 - (-1) = 11$$

$$x_2 + x_3 = 12$$

$$x_1 + x_3 = 0$$

$$x_3 = 0 - x_1$$

$$x_3 = 0 - (-1) = 1$$

Ans: A(-1, -1)
B(11, 3)
C(1, 7)

$$(10 - x_1) + (0 - x_1) = 12$$

$$10 - x_1 + 0 - x_1 = 12$$

$$-2x_1 = 12 - 10$$

$$-2x_1 = 2$$

$$x_1 = 2 / -2$$

$$x_1 = -1$$

QUESTIONS



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 cm = 1 unit.) Using Fig. 1.5, answer the given questions.

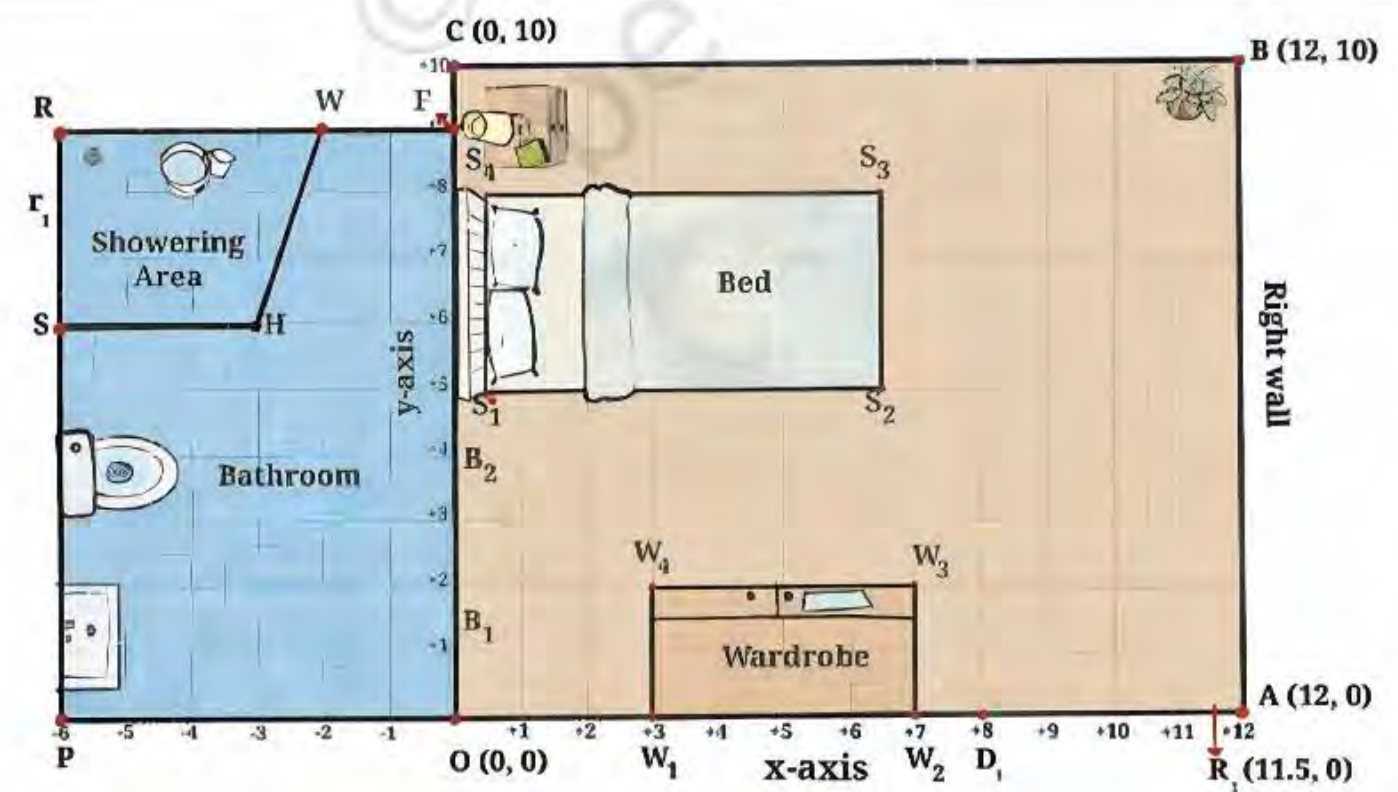


Fig. 1.5

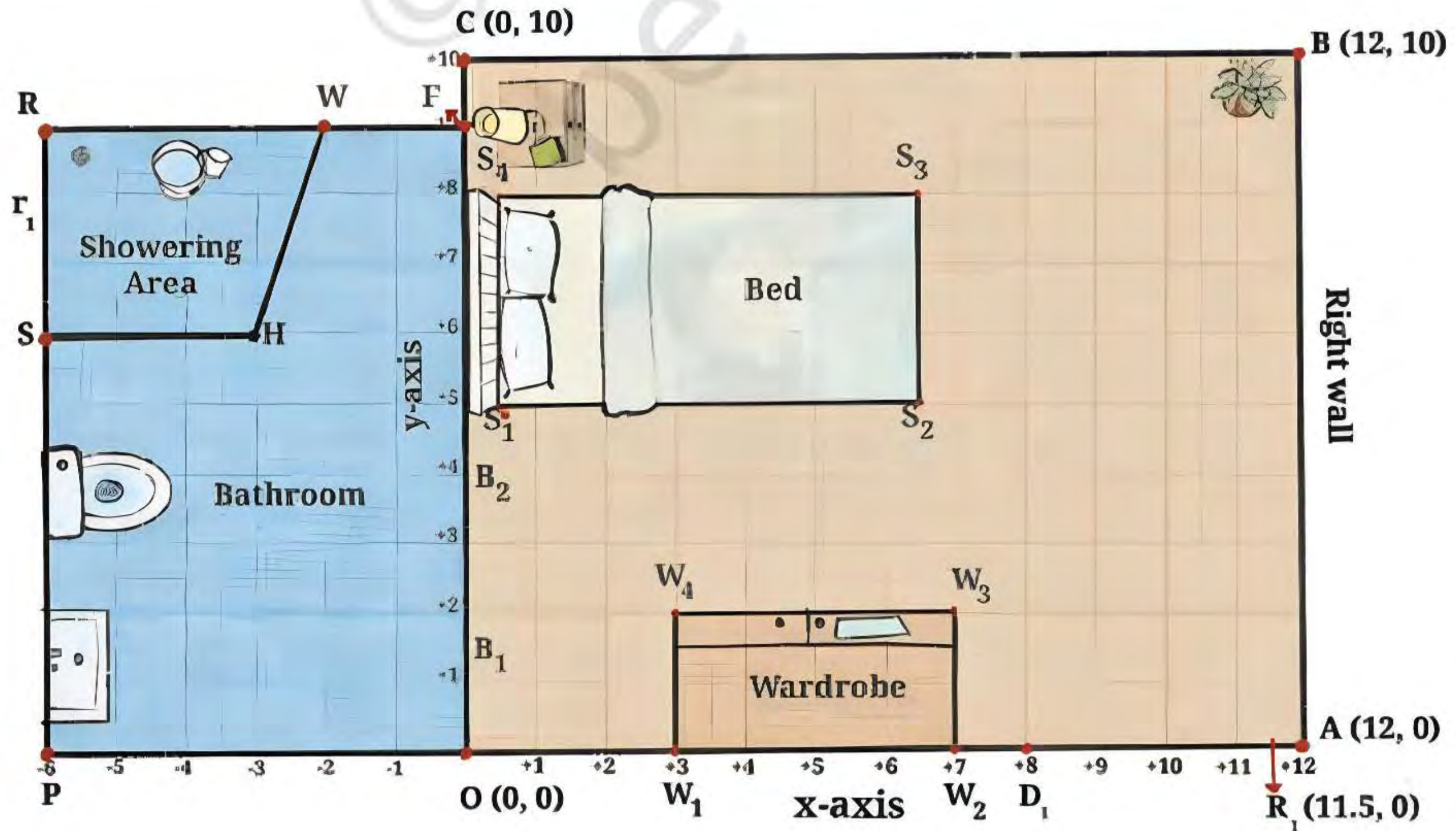


Fig. 1.5

QUESTIONS



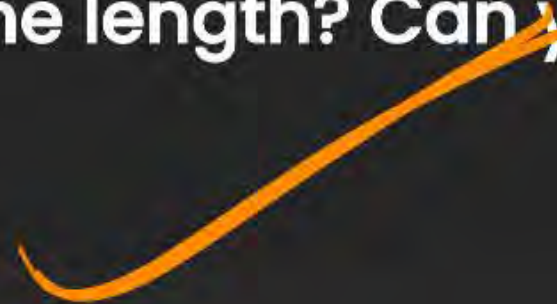
1. Place Reiaan's rectangular study table with three of its feet at the points $(8, 9)$, $(11, 9)$ and $(11, 7)$.

(i) Where will the fourth foot of the table be?

(ii) Is this a good spot for the table?

(iii) What is the width of the table? The length? Can you make out the height of the table?

#done



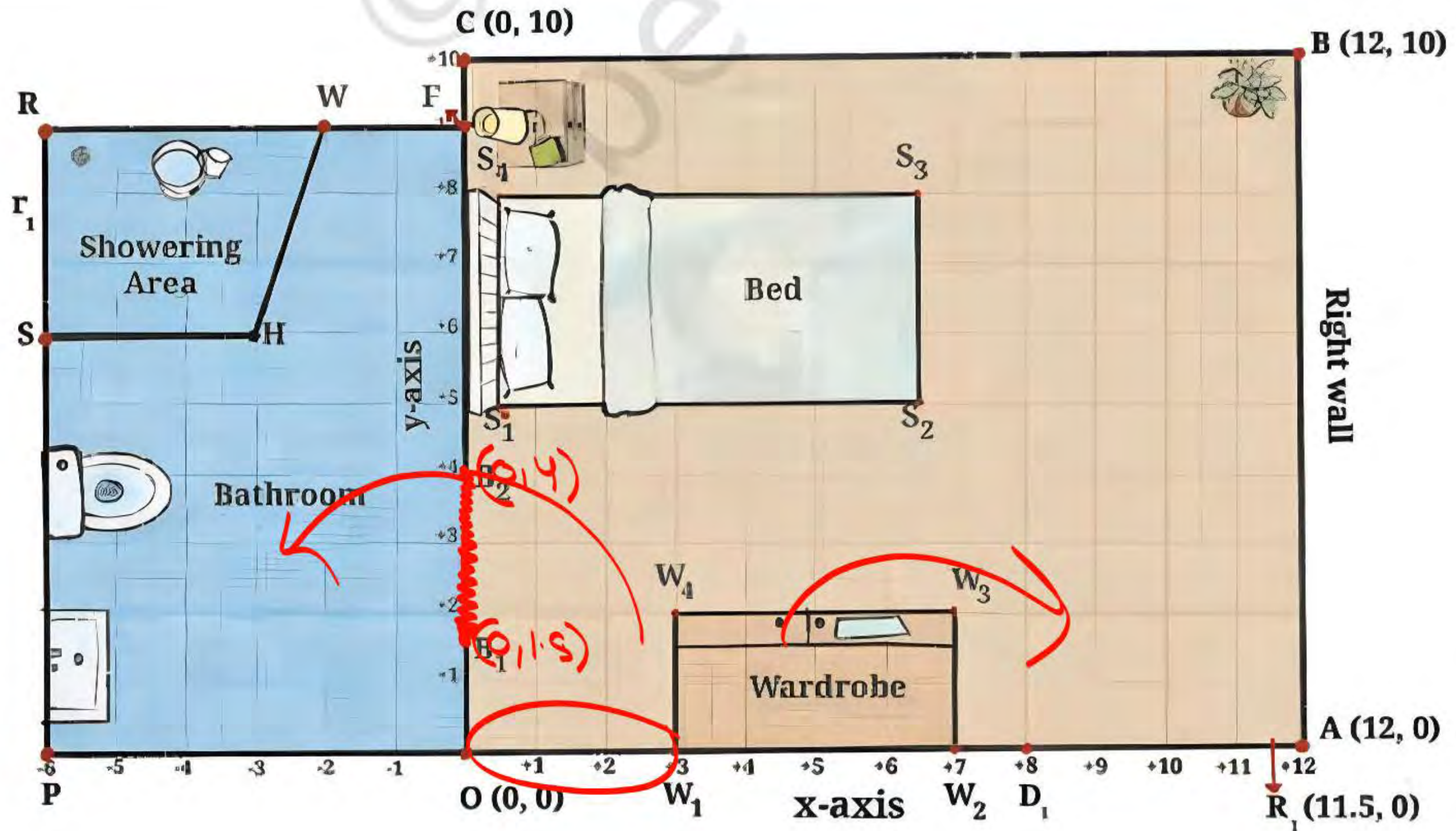


Fig. 1.5

QUESTIONS



2. 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?

No



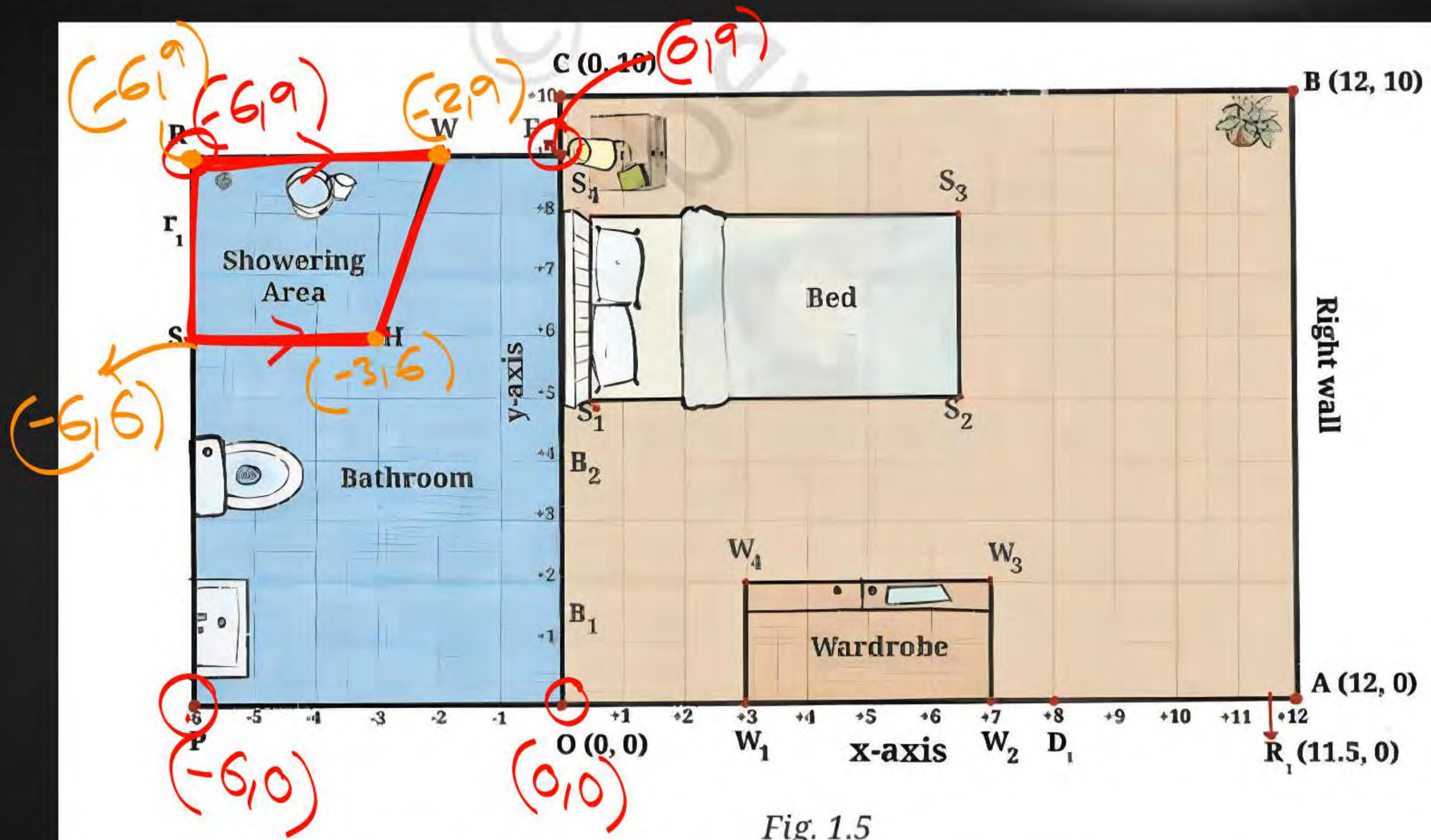


Fig. 1.5

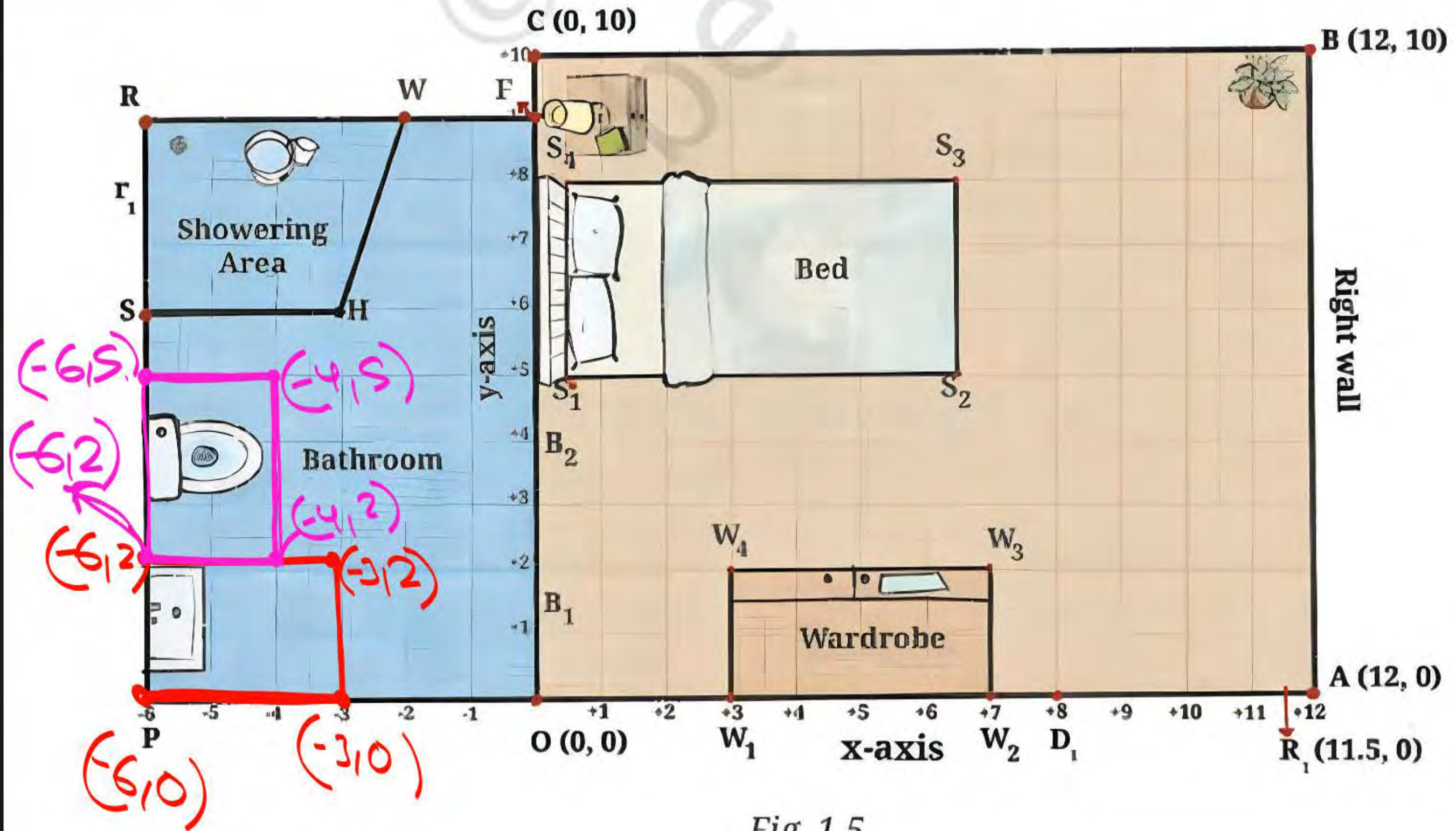


Fig. 1.5

QUESTIONS

✓ 3. Look at Reiaan's bathroom.

(i) What are the coordinates of the four corners O, F, R and P of the bathroom?

(ii) What is the shape of the showering area SHWR in Reiaan's bathroom? Write the coordinates of the four corners.

(iii) Mark off a 3 ft × 2 ft space for the washbasin and a 2 ft × 3 ft space for the toilet. Write the coordinates of the corners of these spaces.

(iii) $\overset{\text{horizontal}}{\underbrace{3\text{ft} \times 2\text{ft}}_{\text{vertical}}} \rightarrow \text{washbasin}$
 $2\text{ft} \times 3\text{ft} \rightarrow \text{toilet}$

trapezium

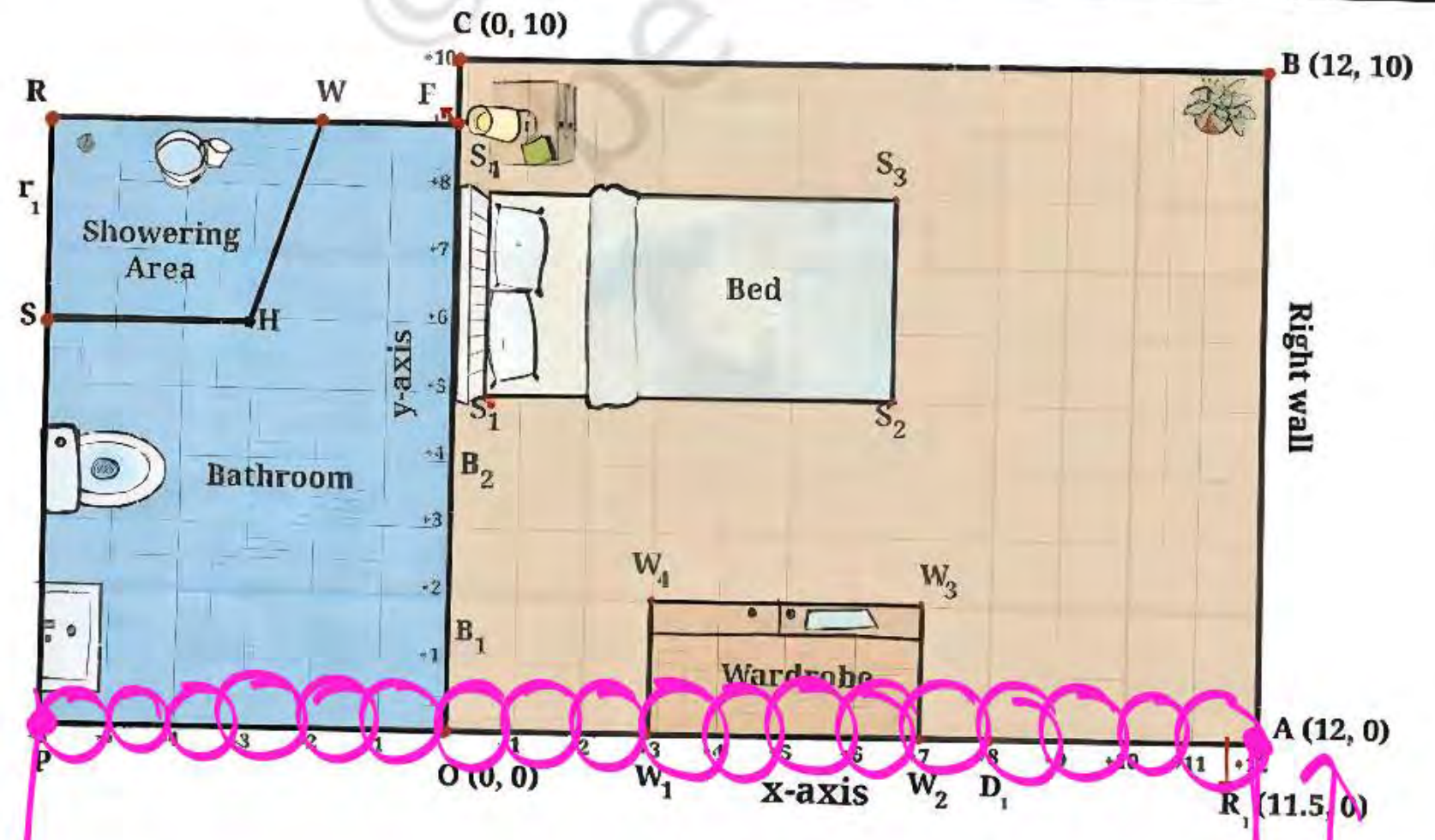


Fig. 1.5

Handwritten pink annotations:

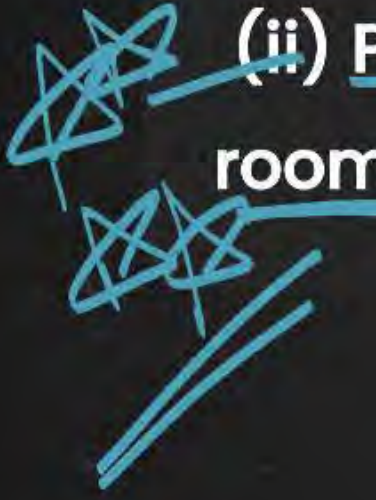
- A large pink arrow pointing from the origin $O(0, 0)$ to the point $R_1(11.5, 0)$ is labeled **18 Ft** in a circle.
- A vertical pink arrow pointing from the x-axis to the right wall is labeled **5 Ft** in a circle.

QUESTIONS

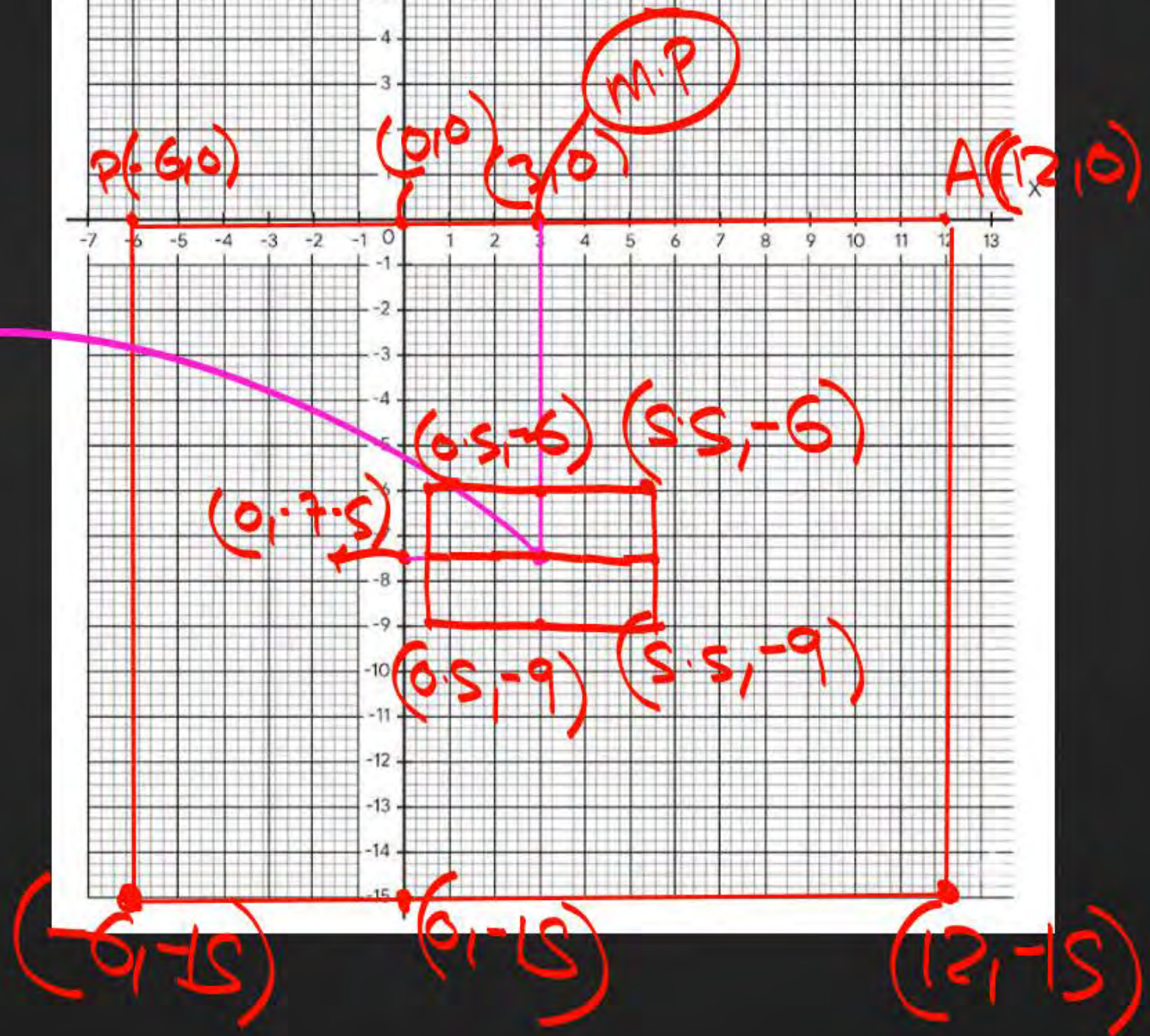


4. Other rooms in the house:

(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 ft × 3 ft dining table precisely in the centre of the dining room. Write down the coordinates of the feet of the table.

$(3, -7.5)$



$SF + XJF +$
 $\downarrow$
 $2.5 / 2.5$
 $1.5 / 1.5$

END-OF-CHAPTER EXERCISES

- What are the x-coordinate and y-coordinate of the point of intersection of the two axes?
- 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?
- 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:
 - Two sides of RAMP that are perpendicular to each other.
 - One side of RAMP that is parallel to one of the axes.
 - 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.
- Plot point Z (5, -6) on the Cartesian plane. Construct a right-angled triangle IZN and find the lengths of the three sides.
(Comment: Answers may differ from person to person.)
- 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?
- *6. 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.
- *7. 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.
- *8. Using the origin as one vertex, plot the vertices of:
 - A right-angled isosceles triangle.
 - An isosceles triangle with one vertex in Quadrant III and the other in Quadrant IV.
- The following table shows the coordinates of points S, M and T. In each case, state whether M is the midpoint of segment ST. Justify your answer.

S	M	T	Is M the midpoint of ST? Yes or No	Reason for your answer
(-3, 0)	(0, 0)	(3, 0)		
(2, 3)	(3, 4)	(4, 5)		
(0, 0)	(0, 5)	(0, -10)		
(-8, 7)	(0, -2)	(6, -3)		

When M is the mid-point of ST, can you find any connection between the coordinates of M, S and T?

- Use the connection you found to find the coordinates of B given that M (-1, 1) is the midpoint of A (3, -4) and B (x, y).
- *11. 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 (8, -2).
- *12.
 - 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?
 - 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.
- *13. 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.
14. 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.
 - Using 1 cm = 200 m, draw a model of the city in your notebook. Represent the roads/streets by single lines.
 - 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:

- how many street intersections can be referred to as (4, 3).
- how many street intersections can be referred to as (3, 4).

15. 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:
 - whether any part of either circle lies outside the screen.
 - whether the two circles intersect each other.
16. 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?

Thank You !

- *Work Hard.*
- *Dream big.*
- *Never give up.*