

Mathematics

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(Chapter – 12) (Introduction to Three Dimensional Geometry)

(Class – XI)

Exercise 12.1

Question 1:

A point is on the x -axis. What are its y -coordinates and z -coordinates?

Answer 1:

If a point is on the x -axis, then its y -coordinates and z -coordinates are zero.

Question 2:

A point is in the XZ -plane. What can you say about its y -coordinate?

Answer 2:

If a point is in the XZ plane, then its y -coordinate is zero.

Question 3:

Name the octants in which the following points lie:

(1, 2, 3), (4, -2, 3), (4, -2, -5), (4, 2, -5), (-4, 2, -5), (-4, 2, 5), (-3, -1, 6),
(2, -4, -7)

Answer 3:

The x -coordinate, y -coordinate, and z -coordinate of point (1, 2, 3) are all positive. Therefore, this point lies in octant **I**.

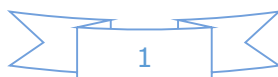
The x -coordinate, y -coordinate, and z -coordinate of point (4, -2, 3) are positive, negative, and positive respectively. Therefore, this point lies in octant **IV**.

The x -coordinate, y -coordinate, and z -coordinate of point (4, -2, -5) are positive, negative, and negative respectively. Therefore, this point lies in octant **VIII**.

The x -coordinate, y -coordinate, and z -coordinate of point (4, 2, -5) are positive, positive, and negative respectively. Therefore, this point lies in octant **V**.

The x -coordinate, y -coordinate, and z -coordinate of point (-4, 2, -5) are negative, positive, and negative respectively. Therefore, this point lies in octant **VI**.

The x -coordinate, y -coordinate, and z -coordinate of point (-4, 2, 5) are negative, positive, and positive respectively. Therefore, this point lies in octant **II**.



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The x-coordinate, y-coordinate, and z-coordinate of point $(-3, -1, 6)$ are negative, negative, and positive respectively. Therefore, this point lies in octant **III**.

The x-coordinate, y-coordinate, and z-coordinate of point $(2, -4, -7)$ are positive, negative, and negative respectively. Therefore, this point lies in octant **VIII**.

Question 4:

Fill in the blanks:

- (i) The x-axis and y-axis taken together determine a plane known as _____.
- (ii) The coordinates of points in the XY-plane are of the form _____.
- (iii) Coordinate planes divide the space into _____ octants.

Answer 4:

- (i) The x-axis and y-axis taken together determine a plane known as **xy - plane**.
- (ii) The coordinates of points in the XY-plane are of the form **$(x, y, 0)$** .
- (iii) Coordinate planes divide the space into **eight** octants.

