

Exercise 11.1

Question 1:

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

Solution:

If a point is on the x -axis, then the coordinates of y and z are 0.

So, the point is $(x, 0, 0)$.

Question 2:

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

Solution:

If a point is in XZ -plane, then its y -coordinate is 0.

Question 3:

Name the octants in which the following points lie:

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

Solution:

Here is the table which represents the octants:

| Octants | I | II | III | IV | V | VI | VII | VIII |
|---------|---|----|-----|----|---|----|-----|------|
| x | + | - | - | + | + | - | - | + |
| y | + | + | - | - | + | + | - | - |
| z | + | + | + | + | - | - | - | - |

- (i) $(1, 2, 3)$
Here x is positive, y is positive, and z is positive.
So, it lies in I octant.

- (ii) $(4, -2, 3)$
Here x is positive, y is negative, and z is positive.
So, it lies in IV octant.

- (iii) $(4, -2, -5)$
Here x is positive, y is negative, and z is negative.
So, it lies in VIII octant.

- (iv) $(4, 2, -5)$
Here x is positive, y is positive, and z is negative.
So, it lies in V octant.
- (v) $(-4, 2, -5)$
Here x is negative, y is positive, and z is negative.
So, it lies in VI octant.
- (vi) $(-4, 2, 5)$
Here x is negative, y is positive, and z is positive.
So, it lies in II octant.
- (vii) $(-3, -1, 6)$
Here x is negative, y is negative, and z is positive.
So, it lies in III octant.
- (viii) $(2, -4, -7)$
Here x is positive, y is negative, and z is negative.
So, it lies in VIII octant.

Question 4:

Fill in the blanks:

- (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.

