EXERCISE 12.1 PAGE NO. 271

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).

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

Solution:

If a point is in the XZ plane, then its y-co-ordinate is 0.

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 the I octant.

(ii) (4, -2, 3)

Here, x is positive, y is negative, and z is positive.

So, it lies in the IV octant.

(iii) (4, -2, -5)

Here, x is positive, y is negative, and z is negative.

So, it lies in the VIII octant.

(iv) (4, 2, -5)

Here, x is positive, y is positive, and z is negative.

So, it lies in the 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 the II octant.

(vii) (-3, -1, 6)

Here, x is negative, y is negative, and z is positive.

So, it lies in the III octant.

(viii) (2, -4, -7)

Here, x is positive, y is negative, and z is negative.

So, it lies in the VIII octant.

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.

Solution:

(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.