Co-Ordinate Geometry Ex 14.1 Q2

Answer :

The distance between any two adjacent vertices of a square will always be equal. This distance is nothing but the side of the square.

Here, the side of the square '*ABCD*' is given to be '2*a*'.

(i) Since it is given that the vertex '*A*' coincides with the origin we know that the co-ordinates of this point is (0, 0).

We also understand that the side '*AB*' is along the *x*-axis. So, the vertex '*B*' has got to be at a distance of '2*a*' from '*A*'.

Hence the vertex '*B*' has the co-ordinates (2*a*, 0).

Also it is said that the side '*AD*' is along the *y*-axis. So, the vertex '*D*' it has got to be at a distance of '2*a*' from '*A*'.

Hence the vertex '*D*' has the co-ordinates (0, 2*a*)

Finally we have vertex '*C*' at a distance of '2*a*' both from vertex '*B*' as well as '*D*'.

Hence the vertex of '*C*' has the co-ordinates (2*a*, 2*a*)

So, the co-ordinates of the different vertices of the square are

$$\boxed{\begin{array}{l} A(0,0) \\ B(2a,0) \\ C(2a,2a) \\ D(0,2a) \end{array}}$$

(ii) Here it is said that the centre of the square is at the origin and that the sides of the square are parallel to the axes.

Moving a distance of half the side of the square in either the '*upward*' or '*downward*' direction and also along either the '*right*' or '*left*' direction will give us all the four vertices of the square.

Half the side of the given square is '*a*'.

The centre of the square is the origin and its vertices are (0, 0). Moving a distance of '*a*' to the right as well as up will lead us to the vertex '*A*' and it will have vertices (*a*, *a*).

Moving a distance of '*a*' to the left as well as up will lead us to the vertex '*B*' and it will have vertices (-(−*a*, *a*).

Moving a distance of '*a*' to the left as well as down will lead us to the vertex '*C*' and it will have vertices (-(−*a*, -−*a*).

Moving a distance of '*a*' to the right as well as down will lead us to the vertex '*D*' and it will have vertices (*a*,-,−*a*).

So, the co-ordinates of the different vertices of the square are

$$\boxed{\begin{array}{l} A(a,a) \\ B(-a,a) \\ C(-a,-a) \\ D(a,-a) \end{array}}$$

Co-Ordinate Geometry Ex 14.1 Q3

Answer :

In an equilateral triangle, the height '*h*' is given by

$$h = \frac{\sqrt{3}(\text{Side of the equilateral triangle})}{2}$$

Here it is given that '*PQ*' forms the base of two equilateral triangles whose side measures '2*a*' units.

The height of these two equilateral triangles has got to be

$$h = \frac{\sqrt{3}(\text{Side of the equilateral triangle})}{2}$$
$$= \frac{\sqrt{3}(2a)}{2}$$
$$h = a\sqrt{3}$$

In an equilateral triangle the height drawn from one vertex meets the midpoint of the side opposite this vertex.

So here we have '*PQ*' being the base lying along the *y*-axis with its midpoint at the origin, that is at *(0, 0)*.

So the vertices '*R*' and '*R*'' will lie perpendicularly to the *y*-axis on either sides of the origin at a distance of '$a\sqrt{3}$' units.

Hence the co-ordinates of '*R*' and '*R*'' are

$$\boxed{\begin{array}{l} R(a\sqrt{3},0) \\ R'(-a\sqrt{3},0) \end{array}}$$

*********** END **********