



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 '2a'.

(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 '2a' from 'A'.

Hence the vertex 'B' has the co-ordinates (2a, 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 '2a' from 'A'.

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

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

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

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

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

(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

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

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 '2a' units.

The height of these two equilateral triangles has got to be

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

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√3' units.

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

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

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