Step-1

Given that columns of a matrix A are n vectors from the set $\mathbb{R}^m$.

To find the rank of matrix A if they are linearly independent.

Step-2

Rank of a matrix is the number of maximum independent rows = number of maximum independent columns.

Now, if columns of A are n vectors and they all are linearly independent then number of maximum independent columns is n.

Hence, rank of A will be n.

Step-3

Given that columns of a matrix A are n vectors from the set $\mathbb{R}^m$.

To find the rank of matrix A if they span $\mathbb{R}^m$.

Step-4

Rank of a matrix is the number of maximum independent rows = number of maximum independent columns.

As the columns of matrix are vector from $\mathbb{R}^m$ and they span $\mathbb{R}^m$ so maximum independent columns is m.

Hence, rank of A will be m.

Step-5

Given that columns of a matrix A are n vectors from the set $\mathbb{R}^m$.

To find the rank of matrix A if they are a basis for $\mathbb{R}^m$.

Step-6

Rank of a matrix is the number of maximum independent rows = number of maximum independent columns.

As the columns of matrix are vector from $\mathbb{R}^m$ and they span (basis is the independent set of vectors spanning a vector space) $\mathbb{R}^m$ so independent columns is m.

Hence, rank of A will be m.