Step-1

We know that the dimension of the vector space $\mathbf{R}^3$ is 3

So, any three vectors in $\mathbf{R}^3$ can form a basis provided they are linearly independent.

A set of vectors is linearly independent if the vectors considered as columns form a square matrix with determinant not zero.

Now, the vectors (1, 1, 3) , (2, 3, 6), and (1, 4, 3) are considered as columns of A, then the determinant of A is $\begin{vmatrix} 1 & 2 & 1 \\ 1 & 3 & 4 \\ 3 & 6 & 3 \end{vmatrix} \sim \begin{vmatrix} 1 & 2 & 1 \\ 0 & 1 & 3 \\ 0 & 0 & 0 \end{vmatrix} = 0$

So, (1, 1, 3), (2, 3, 6), and (1, 4, 3) do not form a basis to $\mathbf{R}^3$