Step-1

Suppose **P** is a plane through $(0,0,0)$ and **L** is a line through $(0,0,0)$.

The smallest vector space containing both **P** and **L** is either **P** or $\mathbf{R}^3$.

Because,

1. If the line **L** is in the plane **P**, then **P** is itself a smallest vector space containing both **L** and **P**

2. If the line **L** is not in the plane **P** then dimension of the vector space is greater than the maximum of dimension of **L** dimension of **P**.

Therefore it must have dimension 3

(Since $\dim \mathbf{L} = 1, \dim \mathbf{P} = 2$)

Therefore, it must be $\mathbf{R}^3$.