



REAL SPACE

Why

We are constantly thinking of \mathbf{R}^3 as points of space.¹

Discussion

We commonly associate elements of \mathbf{R}^3 with points in space. (see Geometry).

Principle 1 (Plane Sets). *There exists a set of all planes.*

Principle 2 (Real Space Correspondence). *Let P be the set of all planes of space. Then $\cup P$ is the set of all lines and $\cup \cup P$ is the set of all points. There exists a one-to-one correspondence mapping elements of $\cup \cup P$ onto elements of \mathbf{R}^3 .*

For this reason, we sometimes call elements of \mathbf{R}^3 *points*. We call the point associated with $(0,0,0)$ the *origin*. We call the element of \mathbf{R}^3 which corresponds to a point the *coordinates* of the point.

Visualization

To visualize the correspondence we draw three perpendicular lines. We call these *axes*. We then associate a point of the line with $(0,0,0) \in \mathbf{R}^3$. We can label it so. We then pick a unit length. And proceed as usual.²

¹Future editions will modify this sheet.

²Future editions will expand this.

