



Why

We are constantly thinking of the real numbers as the points of a line.¹

Discussion

We commonly associate elements of the real numbers (see [Real Numbers](#)) with points on a line (see [Geometry](#)).

Principle 1 (Point Sets). *Given a line, there exists a set of its (infinite) points.*

Principle 2 (Real Line Correspondence). *Let P be the set of points for a line. There exists a one-to-one correspondence mapping elements of P onto elements of \mathbf{R} .*

For this reason, we sometimes call elements of the real numbers *points*. We call the point associated with 0 the *origin*.

Visualization

To visualize the correspondence we draw a line. We then associate a point of the line with the $0 \in \mathbf{R}$. We can label it so. We then pick a unit length. We associate the points a unit length away from zero with $1 \in \mathbf{R}$ (on the right) and $-1 \in \mathbf{R}$ (on the left). We do the same for two and 2 and -2 , 3 and -3 , and then we say that we could continue the process indefinitely. We can visualize the image in Figure 1.

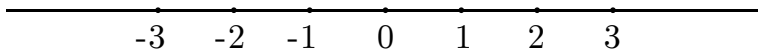


Figure 1: The real line

¹Future editions will modify this sheet.

