

Example 2 Graph $y = 2x - 3$ in \mathbb{R}^2 and \mathbb{R}^3 .

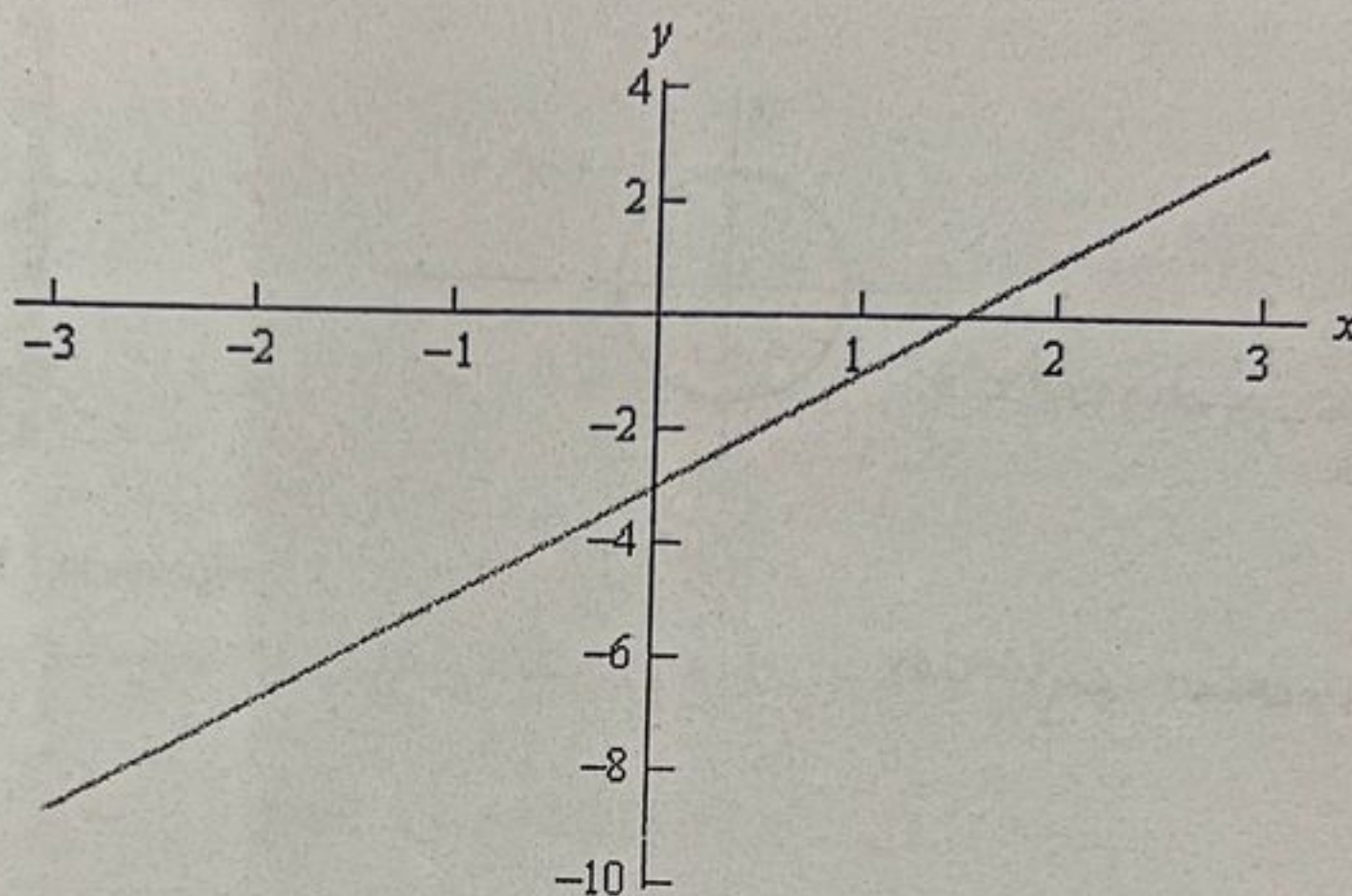
Solution

Of course we had to throw out \mathbb{R} for this example since there are two variables which means that we can't be in a 1-D space.

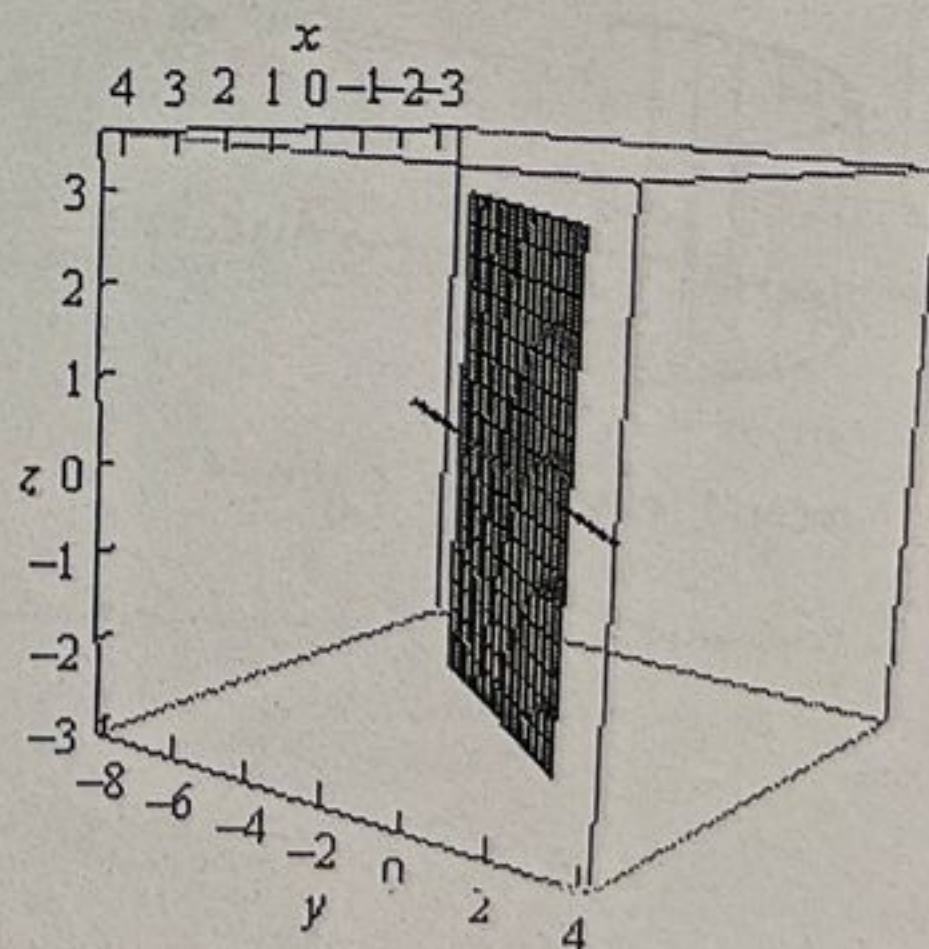
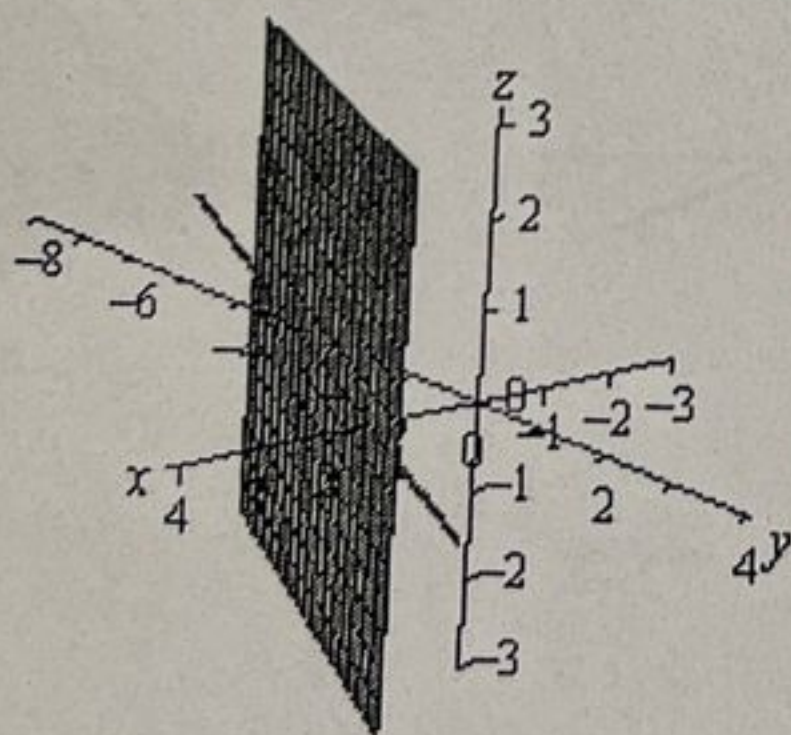
In \mathbb{R}^2 this is a line with slope 2 and a y intercept of -3.

However, in \mathbb{R}^3 this is not necessarily a line. Because we have not specified a value of z we are forced to let z take any value. This means that at any particular value of z we will get a copy of this line. So, the graph is then a vertical plane that lies over the line given by $y = 2x - 3$ in the xy -plane.

Here is the graph in \mathbb{R}^2 .



here is the graph in \mathbb{R}^3 .



Notice that if we look to where the plane intersects the xy -plane we will get the graph of the line in \mathbb{R}^2 as noted in the above graph by the red line through the plane.