
We have obtained the equation of a sphere centered at \((a, b, c)\) with radius \(r\) as

\[ r^2 = (x-a)^2 + (y-b)^2 + (z-c)^2 \]

\[ r^2 = x^2 + y^2 + z^2 \]

\((a, b, c) = (a, b, c)\)
Graph / Solution set of an equation in $\mathbb{R}^n$, $n=1, 2, 3$

1) $x^2 = -1$ has no solution in $\mathbb{R}$ or $\mathbb{R}^2$, or $\mathbb{R}^3$.

2) $|x| = 1$ has two solutions in $\mathbb{R}$, which are $x = 1$, $x = -1$.

3) $|x| = 1$ has infinitely many solutions in $\mathbb{R}^2$, which are $(1, y)$ and $(-1, y)$ for any $y \in \mathbb{R}$.

4) $y = 1$ has infinitely many solutions in $\mathbb{R}^3$.

5) $x^2 + y^2 = 1$ is a circle in $\mathbb{R}^2$.

6) $(x-1)^2 + (y-3)^2 = 1$ is a circle in $\mathbb{R}^2$.

7) $x \leq 1$, $y \leq 1$ in $\mathbb{R}^2$.