Also,

$$\|a\| = \|\langle a_1, a_2, a_3\rangle\| = \sqrt{a_1^2 + a_2^2 + a_3^2},$$

so

$$\|c\mathbf{a}\| = |c|\|\mathbf{a}\|, \quad \mathbf{0} = \langle 0, 0, 0\rangle, \text{ and}$$
$$-\mathbf{a} = \langle -a_1, -a_2, -a_3\rangle$$

NOTE. The vector with initial point $P(a_1, a_2, a_3)$ and terminal point $Q(b_1, b_2, b_3)$ corresponds to the position vector

$$\overrightarrow{PQ} = \langle b_1 - a_1, b_2 - a_2, b_3 - a_3\rangle.$$

The standard basis consists of

$$\mathbf{i} = \langle 1, 0, 0, \rangle, \quad \mathbf{j} = \langle 0, 1, 0\rangle, \quad \mathbf{k} = \langle 0, 0, 1\rangle \text{ with}$$
$$\|\mathbf{i}\| = \|\mathbf{j}\| = \|\mathbf{k}\| = 1.$$

For any vector $\mathbf{a} = \langle a_1, a_2, a_3\rangle$,

$$\mathbf{a} = a_1\mathbf{i} + a_2\mathbf{j} + a_3\mathbf{k}.$$

Also, for any vector $\mathbf{a} = \langle a_1, a_2, a_3\rangle \neq \mathbf{0}$, a unit vector $\mathbf{u}$ in the same direction as $\mathbf{a}$ is

$$\mathbf{u} = \frac{1}{\|\mathbf{a}\|}\mathbf{a}.$$

The sphere of radius r centered at (a, b, c) consists of all points (x, y, z) such that

$$d\big\{(x, y, z), (a, b, c)\big\} = \sqrt{(x-a)^2 + (y-b)^2 + (z-c)^2}$$

or

$$(x-a)^2 + (y-b)^2 + (z-c)^2 = r^2,$$

the standard form of the equation of a sphere.