Student handout

The state vectors $|+\rangle$ and $|-\rangle$ form an orthormal basis. Orthonormal bases have properties listed below.

For each property, write an equation that illustrates the property for both:

- The Cartesian basis vectors $\hat{x}$, $\hat{y}$, and $\hat{z}$.
- The spin state vectors $|+\rangle$ and $|-\rangle$.

1. The elements are **norm 1**.
2. The elements are **orthogonal**.
3. The elements form a **complete set**. Any vector in the space can be written as a linear combination of the two.