

1. Recall the **standard basis vectors** in \mathbb{R}^3 :

$$\vec{i} = \langle 1, 0, 0 \rangle, \quad \vec{j} = \langle 0, 1, 0 \rangle, \quad \vec{k} = \langle 0, 0, 1 \rangle$$

Write the vector $\vec{v} \langle -2, 3, 10 \rangle$ as a linear combination of the standard basis vectors.

2. Are the points below collinear? (Is there a line containing all of them?)

$$P = (1, 0, 2), \quad Q = (6, -1, 0), \quad R = (-9, 2, 6)$$

3. Are the vectors $\vec{u} = \langle 3, 1, -5 \rangle$ and $\vec{v} = \langle -6, -2, 10 \rangle$ parallel? Explain.

4. Are the vectors $\vec{u} = \langle 3, 1, -5 \rangle$ and $\vec{v} = \langle 2, 2, 2 \rangle$ perpendicular? Explain.