Orthogonality

If $\vec{u} \cdot \vec{v} = 0$, then $\vec{u}, \vec{v}$ are Orthogonal

If 2 vectors are orthogonal, then $||\vec{u} + \vec{v}||^2 = ||\vec{u}||^2 + ||\vec{v}||^2$

Find the vector orthogonal to $\begin{bmatrix} 1 \\ 2 \end{bmatrix}$.

$$\begin{bmatrix} 1 \\ 2 \end{bmatrix}^{\perp} = \begin{bmatrix} 2 \\ -1 \end{bmatrix}$$

Proof,

$$\vec{u} \cdot \vec{v} = \begin{bmatrix} 2 \\ -1 \end{bmatrix} \cdot \begin{bmatrix} 1 \\ 2 \end{bmatrix}^{\perp} = 0$$