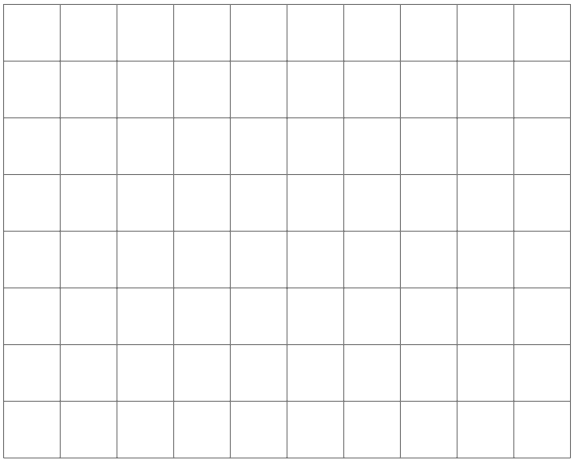
1. Find a vector $\mathbf{v}$ such that the line $7x + 5y = 0$ lies along $\mathbf{v}$.

2. Find parametric equations of the line passing through $\begin{pmatrix} 2 \\ -1 \end{pmatrix}$ and $\begin{pmatrix} 4 \\ 3 \end{pmatrix}$.

3. Find all y such that the vectors $\begin{pmatrix} 9 \\ y \end{pmatrix}$ and $\begin{pmatrix} y \\ 4 \end{pmatrix}$ are linearly dependent.

4. Find the matrices for the rotations $\mathbf{R}_{90^\circ}$ and $\mathbf{R}_{-90^\circ}$. Be sure to label which is which.

5. Find a formula for the projection onto the line in the direction of $\begin{pmatrix} 3 \\ -2 \end{pmatrix}$. Sketch an example by drawing a nonzero vector $\mathbf{X}$ and its projection.



6. Using the dot product, find a so that the vectors $\begin{pmatrix} 4 \\ -2 \end{pmatrix}$ and $\begin{pmatrix} 3 \\ a \end{pmatrix}$ are perpendicular.

7. Let $\mathbf{S}$ be the reflection about the line $2x - 7y = 0$. As efficiently as possible, evaluate $\mathbf{S}\left(\mathbf{S}\begin{pmatrix} 7 \\ 3 \end{pmatrix}\right)$.