1. Let $\mathbf{a} = \langle 1, 2, 4 \rangle$ and $\mathbf{b} = \langle -1, 2, 1 \rangle$. Compute $\text{comp}_\mathbf{b}\mathbf{a}$ and $\text{proj}_\mathbf{b}\mathbf{a}$ *(5 points)*

2. Find all vectors of length 3 that are orthogonal to both of the vectors $\langle 1, 1, 1 \rangle$ and $\langle -2, 3, 4 \rangle$. *(5 points)*

3. Find an equation of the plane that contains the point $(5, -1, 2)$ and the line given by the vector equation $\langle x, y, z \rangle = \langle 1, 2, 3 \rangle + t\langle 3, 2, 1 \rangle$. *(5 points)*

4. Find an equation of the line that contains the point $(3, 1, 3)$ and is perpendicular to the plane $3x + 2y - z = 987$. *(5 points)*