1. Find the $\|\text{proj}_\mathbf{a}\mathbf{u}\|$.

   (1) $\mathbf{u} = (1, -2), \ \mathbf{a} = (-4, -3)$.

   (2) $\mathbf{u} = (5, 6), \ \mathbf{a} = (2, -1)$.

2. Calculate the distance between the point $(-3, 1)$ and the line $4x + 3y + 4 = 0$.

3. Calculate the distance between the point $(3, 1, -2)$ and the plane $x + 2y - 2z = 4$.

4. If $\mathbf{a}$ and $\mathbf{b}$ are orthogonal vectors, show that for every nonzero vectors $\mathbf{u}$, we have

$$\text{proj}_\mathbf{a}(\text{proj}_\mathbf{b}(\mathbf{u})) = \mathbf{0}.$$