

(1) [5] Let $\mathbf{u} = (1, -1, 3, 5)$ and $\mathbf{v} = (2, 1, 0, -3)$. Find scalars a and b so that $a\mathbf{u} + b\mathbf{v} = (1, -4, 9, 18)$

(2) [3] Let $\mathbf{v} = (-2, 3, 0, 6)$. Find all scalars k such that $\|k\mathbf{v}\| = 5$.

(3) [4] Let $\mathbf{u} = (3, 3, 3)$ and $\mathbf{v} = (1, 0, 4)$.

1. Determine $\|\mathbf{u} - \mathbf{v}\|$

2. Determine the angle θ between \mathbf{u} and \mathbf{v} (report your answer in degrees, rounded to 1 decimal.)

(4) [3] Find a unit vector that is orthogonal to both $\mathbf{u} = (1, 0, 1)$ and $\mathbf{v} = (0, 1, 1)$.