Norms and Dot Products and Such

1. Let $\vec{v_1} = (1, 1, 0)$ and $\vec{v_2} = (1, 0, 1)$.
   (a) Are $\vec{v_1}$ and $\vec{v_2}$ linearly independent?
   (b) Do $\vec{v_1}$ and $\vec{v_2}$ span $\mathbb{R}^3$?

2. Compute the following
   (a) $||\vec{v_1}||$
   (b) $||\vec{v_2}||$
   (c) $\vec{v_1} \cdot \vec{v_2}$
   (d) $\vec{v_2} \cdot \vec{v_1}$

3. Normalize $\vec{v_1}$ and $\vec{v_2}$.

4. What is the angle between:
   (a) $\vec{v_1}$ and $\vec{v_2}$?
   (b) $(1, 0, 0, 0)$ and $(0, 0, 2, 0)$?
   (c) $(1, 0, 0, 4)$ and $(0, 3, 2, 0)$?
   (d) $(1, 1, 1, 1)$ and $(2, 1, 1, 1)$?
   (e) $(1, 1, 1, 1)$ and $(2, 2, 2, 2)$?