This quiz is worth 10 points.

1. (2 points) Suppose a and b are n-vectors. Show that if $a \perp b$, then $\|a + b\| = \sqrt{\|a\|^2 + \|b\|^2}$.

2. (8 points) Suppose $a = (1, 1, 0)$ and $b = (0, 1, 1)$.

   (a) Is the angle between a and b acute, obtuse or a right angle?

   (b) Write an equation for the line L between a and b. (Recall that the line determined by two points a and b is given by $L(t) = (1 - t)a + tb$.)

   (c) Show that the point $P = (3, 1, -2)$ lies on the line L determined by a and b.

   (d) **Let Y be the point $(7, 1, 4)$. Show that P is the point on L that is closest to the point Y.**

   (e) Determine the distance between $X = (4, 0, 6)$ and P.