QUIZ X

1. Let $V$ be the space spanned by $v_1 = \cos^2 x$, $v_2 = \sin^2 x$, and $v_3 = \cos 2x$.

   (a) Show that $S = \{v_1, v_2, v_3\}$ is not a basis for $V$.

   (b) Find a basis for $V$.

2. Determine the dimension of and a basis for the solution space of the system:

   \[
   \begin{align*}
   x_1 + x_2 - x_3 &= 0 \\
   -2x_1 - x_2 + 2x_3 &= 0 \\
   -x_1 + x_3 &= 0
   \end{align*}
   \]

   Each problem is worth 5 pts.