MAS 4106 Linear Algebra 2 **Quiz 1** 18 Jan 2006 **Name:** _____
Show **ALL** work for credit; Give exact answers when possible.

1. True or False. Let $V = \{f \in C[0,\pi] : f(2) \geq 0\}$, Let W be all polynomials of degree at most 3 with integers as coefficients and let S be all vectors of the form $\begin{bmatrix} -a+1 \\ a-6b \\ 2b+a \end{bmatrix}$ where a and b represent arbitrary reals.

   (a) The set $\mathbb{R}^{55}$ s a vector space.

   (b) The zero vector is in V.

   (c) If $f \in V$ and $c \in \mathbb{R}$, then $cf \in V$.

   (d) If $f, g \in V$, then $f + g \in V$.

   (e) If $p, q \in W$, then $p + q \in W$

   (f) If $p \in W$, then $5p \in W$

   (g) W is a vector space.

   (h) $S = \text{span}\left\{ \begin{bmatrix} -1 \\ 1 \\ 1 \end{bmatrix}, \begin{bmatrix} 0 \\ -6 \\ 2 \end{bmatrix}, \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix} \right\}$

   (i) The collection of functions of the form $c_1 e^{-2t} + c_2 e^{4t}$ is a vector space.

   (j) The solution set of $x + 6y - 2z = 5$ is a subspace on $\mathbb{R}^3$

2. Show $W = \{f \in C[0,1] : \int_0^1 f(t)\,dt = 0\}$ is a subspace of $C[0,1]$

   (a) Show the zero function is in W.

   (b) Show if $f, g \in W$, then $f + g \in W$

   (c) Show if $f \in W$ and $c \in \mathbb{R}$, then $cf \in W$