MAS 4106 Linear Algebra 2 **Quiz 5** 24 Mar 2006 **Name:**

Show **ALL** work for credit; Give exact answers when possible. This is a Take home, open book, open notes quiz — due Monday 27 Mar.

1. The sets A and B are subsets of the vector space $\mathbb{R}^3$. For each set, either show that it is affine by showing the affine combination $s\vec{w} + (1-s)\vec{v}$ does belong to the set whenever $\vec{w}$ and $\vec{v}$ belong to the set and s is a real scalar; or show that it is not affine by producing elements $\vec{w}$ and $\vec{v}$ of the set and a real scalar s, so that the affine combination $s\vec{w} + (1-s)\vec{v}$ does not belong to given set.

   (a) $A = \{(x, y, z) : x > 0\}$

   (b) $B = \{(x, y, z) : x - z = 5\}$

2. The sets F and S are subsets of the vector space $C([0,1])$, the collection of continuous functions $f : [0,1] \to \mathbb{R}$. Let $F = \{f : \int_0^1 f(t)\,dt = 1\}$ and let $S = \{f : \int_0^1 f(t)\,dt = 0\}$. (You may remember from the first quiz that S is a subspace of $C[0,1]$.) Show If $g \in F$, then $S = F - g = \{f - g : f \in F\}$. [Hint you need to show $F - g \subset S$ and $S \subset F - g$.]