

**Due Tuesday, July 3. To receive credit you MUST SHOW ALL YOUR WORK.**

1. (10 pts) Let  $\mathbf{R}_3[t]$  be the vector space of polynomials  $p(t)$  of degree at most 3 and let  $W$  be the set of all polynomials  $p(t) \in \mathbf{R}_3[t]$  such that  $p(1) = 0$ .

(a) Show that  $W$  is a vector subspace of  $\mathbf{R}_3[t]$ .

(b) Find a basis for  $W$ , and show that what you found is really a basis.

2. (10 pts) Let  $V$  be a vector space of dimension  $n$ .

(a) Show that any set of  $n$  vectors that span  $V$  forms a basis for  $V$ .

(b) Show that any set of  $n$  linearly independent vectors of  $V$  forms a basis for  $V$ .