Math 441 Name_____
Exam III
Fall 2011 **Show All Work**

1) Determine whether or not $\{1+t+t^2, 1+2t, 1-t^2\}$ is a basis for P_2

$a(1+t+t^2)+b(1+2t)+c(1-t^2)=0$

$a+b+c+at+2bt+at^2-ct^2=0$

$a+b+c=0$

$a+2b=0$

$a-c=0$

$$\begin{vmatrix} 1 & 1 & 1 \\ 1 & 2 & 0 \\ 1 & 0 & -1 \end{vmatrix} = \begin{vmatrix} 1 & 1 & 1 \\ 1 & 2 & 0 \\ 2 & 1 & 0 \end{vmatrix} = \begin{vmatrix} 1 & 2 \\ 2 & 1 \end{vmatrix} = -3$$

3 vectors are indep in a 3 dimensional space

yes they form a basis

2) Find a basis for the subspace of R^3 spanned by
$\{(1, 2, -3), (2, 5, -3), (2, 7, 3)\}$

$$\begin{bmatrix} 1 & 2 & -3 \\ 2 & 5 & -3 \\ 2 & 7 & 3 \end{bmatrix} \xrightarrow[-2R_1+R_3]{-2R_1+R_2} \begin{bmatrix} 1 & 2 & -3 \\ 0 & 1 & 3 \\ 0 & 3 & 9 \end{bmatrix} \xrightarrow[-3R_2+R_3]{-2R_2+R_1} \begin{bmatrix} 1 & 0 & -9 \\ 0 & 1 & 3 \\ 0 & 0 & 0 \end{bmatrix}$$

Basis $\{(1,0,-9), (0,1,3)\}$