

Name:

1. For each of the following statements, write the word “true” or “false.”
  - (a) Let  $T_1 : U \rightarrow V$  and  $T_2 : V \rightarrow W$  be two linear transformations. Then the function  $S$  from  $U$  to  $W$  defined by  $S(\mathbf{u}) = T_2(T_1(\mathbf{u}))$  for any  $\mathbf{u} \in U$  is a linear transformation.
  
  
  
  
  
  
  
  
  
  
  - (b) The function  $E : C[a, b] \rightarrow \mathbb{R}$  given by  $E(f) = \int_a^b x \cdot f(x) \, dx$  for any  $f \in C[a, b]$  is a linear transformation.
  
  
  
  
  
  
  
  
  
  
2. Give the coordinates of the polynomial  $p(x) = 1 - x + x^3$  in terms of the basis  $\{1, x - 1, (x - 1)^2, (x - 1)^3\}$  of the vector space  $P_3$ . Write your answer in the form of a column vector.