

MA 371 8/22/03. Vector norm; dot product.

1. Let  $\mathbf{u} = (3, 4, -2, 0, -1)$  and  $\mathbf{v} = (-1, 2, -2, 1, 1)$ 
  - (a) Find a unit vector in the same direction as  $\mathbf{u}$ .
  
  
  
  
  
  
  
  
  
  
  - (b) Express  $\mathbf{u}$  as a linear combination of the standard basis vectors.
  
  
  
  
  
  
  
  
  
  
  - (c) Find the Euclidean distance between  $\mathbf{u}$  and  $\mathbf{v}$ .
  
  
  
  
  
  
  
  
  
  
  - (d) Find the cosine of the angle between  $\mathbf{u}$  and  $\mathbf{v}$ .
  
2. Find a scalar  $k$  such that  $[1 \ 0 \ 2 \ 1 \ 3]$  is orthogonal to  $[-2 \ 1 \ -3 \ k \ 0]$ .
  
  
  
  
  
  
  
  
  
  
3. For what values of  $k$  are  $[1 \ 0 \ k \ k \ 3]$  and  $[k \ -2 \ 2 \ k \ k]$  orthogonal?
  
  
  
  
  
  
  
  
  
  
4. Sec 1.2 # 29.
5. Sec 1.2 # D3.
6. Sec 1.2 # P4a