

### 9.1 & 9.2 Recitation Exercises

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1. Let  $\mathbf{u}$  and  $\mathbf{v}$  be two orthogonal defined as  $\mathbf{u} = k\mathbf{i} + 3\mathbf{j} - 2\mathbf{i}$ , and  $\mathbf{v} = \langle k, -1 \rangle$ , then the sum of all values of  $k$  is equal to  
 A) -4                      B) -2                      C) 2                      D) 4                      E) 0
  
2. Let  $\vec{u} = 2\mathbf{i} - 4\mathbf{j}$  and  $\vec{w} = 3\mathbf{i} - 3\mathbf{j}$ 
  - a) Find a unit vector in the opposite direction of  $\vec{u}$ .
  - b) Find a vector of magnitude 2 in the direction of  $\vec{w}$ .
  
3. Find the value of  $k$  such that the two vectors  $\vec{u} = \langle 3, 4 \rangle$  and  $\vec{v} = \langle 2, k \rangle$  have the same direction.
  
4. Let  $\mathbf{u}, \mathbf{v}$  &  $\mathbf{w}$  be three vectors defined as  $\mathbf{u} = \langle 1, \sqrt{3} \rangle$  and  $\mathbf{v} = \sqrt{3}\mathbf{j} + \mathbf{i}$ , and  $\mathbf{w} = 2\mathbf{u} - \mathbf{v}$ . Then find the direction angle of  $\mathbf{w}$ .
  
5. If  $\theta$  is an angle between the vectors  $\mathbf{v} = -\mathbf{i} + 2\mathbf{j}$  and  $\mathbf{w} = 2\mathbf{i} - \mathbf{j}$ , then find  $\sin(2\theta)$ , where  $0 \leq \theta \leq \pi$ .