

## Exercises Section 8.5:

I) Find the angle between the two vectors.

- 1)  $\vec{v} = -5\vec{i} + 2\vec{j}$  ,  $\vec{u} = 3\vec{i} - 7\vec{j}$     2)  $\vec{v} = 3\sqrt{2}\vec{i} - 2\vec{j}$  ,  $\vec{u} = 2\sqrt{2}\vec{i} + 6\vec{j}$   
3)  $\vec{v} = -\frac{\sqrt{3}}{2}\vec{i} + \frac{1}{2}\vec{j}$  ,  $\vec{u} = \frac{\sqrt{3}}{2}\vec{i} + \frac{1}{2}\vec{j}$     4)  $\vec{v} = -\sqrt{3}\vec{i} + \vec{j}$  ,  $\vec{u} = \sqrt{3}\vec{i} + \vec{j}$   
5)  $\vec{v} = -\sqrt{2}\vec{i} + \sqrt{6}\vec{j}$  ,  $\vec{u} = \sqrt{3}\vec{j}$
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II) Determine if the two vectors are parallel, orthogonal, or neither

- 1)  $\vec{v} = 10\vec{i} + 20\vec{j}$  ,  $\vec{u} = -5\vec{i} + 10\vec{j}$     2)  $\vec{v} = 15\vec{i} + 9\vec{j}$  ,  $\vec{u} = -5\vec{i} - 3\vec{j}$   
3)  $\vec{v} = -\frac{3}{5}\vec{i} + \frac{7}{10}\vec{j}$  ,  $\vec{u} = 12\vec{i} - 14\vec{j}$     4)  $\vec{v} = -\frac{9}{10}\vec{i} + 3\vec{j}$  ,  $\vec{u} = -5\vec{i} - \frac{3}{2}\vec{j}$   
5)  $\vec{v} = \frac{2}{3}\vec{i} - \vec{j}$  ,  $\vec{u} = -\vec{i} + \frac{3}{2}\vec{j}$     6)  $\vec{v} = \frac{9}{10}\vec{i} - \frac{3}{4}\vec{j}$  ,  $\vec{u} = -\frac{5}{2}\vec{i} - 3\vec{j}$
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III) Find  $m$  , such that the two vectors are orthogonal.

- 1)  $\vec{v} = -3m\vec{i} + 2\vec{j}$  ,  $\vec{u} = -6\vec{i} - \vec{j}$     2)  $\vec{v} = \vec{i} + 4\vec{j}$  ,  $\vec{u} = 2m\vec{i} - 5\vec{j}$   
3)  $\vec{v} = -4m\vec{i} - 3\vec{j}$  ,  $\vec{u} = 4m\vec{i} - 3\vec{j}$
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IV) Given the two vector

- 1)  $\vec{v} = 4\vec{i} + 2\vec{j}$  ,  $\vec{w} = \vec{i} + 2\vec{j}$     2)  $\vec{v} = 3\vec{j}$  ,  $\vec{w} = 3\vec{i} + 15\vec{j}$   
3)  $\vec{v} = -5\vec{i} - \vec{j}$  ,  $\vec{w} = -\vec{i} + \vec{j}$

Find a) The projection of  $\vec{v}$  on  $\vec{w}$     b) The projection of  $\vec{v}$  orthogonal to  $\vec{w}$

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- V) 1) Find the work done by the force of 4 pounds acting in the direction  $\vec{i} + 3\vec{j}$  in moving an object 3 feet from  $(0,0)$  to  $(3,0)$   
2) Find the work done by the force of 2 pounds acting in the direction  $3\vec{i} + 3\vec{j}$  in moving an object 5 feet from  $(0,0)$  to  $(3,4)$   
3) Find the work done by the force of 3 pounds acting in the direction  $2\vec{i} + \vec{j}$  in moving an object 2 feet from  $(0,0)$  to  $(0,2)$

