

### Chapter # 3 (Vectors)

1- The angle between vector  $\mathbf{B} = 4.0 \mathbf{j} + 3.0 \mathbf{k}$ , and the positive y axis is approximately: [37 degrees]

2- Vector  $\mathbf{A} = (5.0 \mathbf{i} + 3.0 \mathbf{j}) \text{ m}$ , and vector  $\mathbf{B}$  is 6m in length and making 120 degrees angle with +ve x-axis. Find  $\mathbf{A} \cdot \mathbf{B}$ . [( 8.0  $\mathbf{i}$  - 2.2  $\mathbf{j}$ )m]

3- If  $\mathbf{a} = (3.0 \mathbf{i} + 4.0 \mathbf{j}) \text{ m}$  and  $\mathbf{b} = (5.0 \mathbf{i} - 2.0 \mathbf{j}) \text{ m}$ , find the angle between the two vectors. [75 degrees]

4- For the following three vectors;

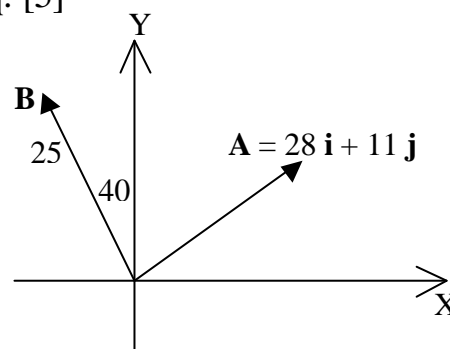
$\mathbf{A} = 2 \mathbf{i} + 3 \mathbf{j} + 4 \mathbf{k}$ ,  $\mathbf{B} = 4 \mathbf{i} + 4 \mathbf{j}$  and  $\mathbf{C} = 2 \mathbf{i} + 2 \mathbf{k}$ , find  $\mathbf{A} \cdot (\mathbf{B} \times \mathbf{A})$ . [0]

5- A vector in the xy-plane has a magnitude of 25.0 and an x-component of 12.0. The angle that it makes with the positive x-axis is: [61.3 degrees]

6- The unit vectors in the positive directions of the x, y, and z axes are labeled  $\mathbf{i}$ ,  $\mathbf{j}$ , and  $\mathbf{k}$ . The value of  $[\mathbf{i} \cdot (\mathbf{j} \times \mathbf{k})]$  is: [+1]

7- Two vectors  $\mathbf{A} = 3 \mathbf{i} + \mathbf{j} + 2 \mathbf{k}$  and  $\mathbf{B} = 2 \mathbf{i} + 4 \mathbf{j} + q \mathbf{k}$  (q is a constant) are perpendicular to each other. Find the constant q. [5]

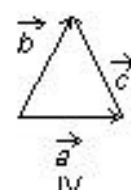
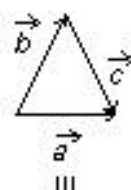
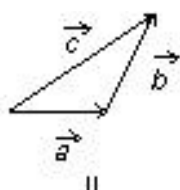
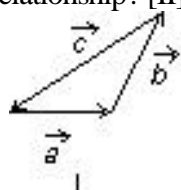
8- If vector  $\mathbf{A} = 28 \mathbf{i} + 11 \mathbf{j}$  and vector  $\mathbf{B}$  (magnitude of  $B = 25$ ) as shown in the figure, what is the magnitude of the sum of these two vectors? [32]



9- Vector  $\mathbf{A} = -6 \mathbf{i} + 14 \mathbf{j}$ . Find vector  $\mathbf{B}$  whose magnitude is twice that of  $\mathbf{A}$  and is opposite in direction to  $\mathbf{A}$ . [12  $\mathbf{i}$  - 28  $\mathbf{j}$ ]

10- If vector  $\mathbf{A} = 6 \mathbf{i} - 7 \mathbf{j}$  and vector  $\mathbf{B} = -12 \mathbf{i} + 10 \mathbf{j}$ , what angle does vector  $\mathbf{C} = 2 \cdot \mathbf{A} - \mathbf{B}$  make with +x-axis measured counterclockwise.

11- The vectors v, w, and x are related by  $\mathbf{x} = \mathbf{v} + \mathbf{w}$ . Which diagram below illustrates this relationship? [III]



12- A vector of magnitude 3 CANNOT be added to a vector of magnitude 4 so that the magnitude of the resultant is:

- A) [zero]      B) 1      C) 3      D) 5      E) 7