Mathematics for Computer Graphics
Tutorial 6

Exercise 1

Three vectors **a**, **b** and **c** are used to construct two other vectors **A** and **B** as follows: **A = a + c** and **B = b – a.** Find **A** and **B** calculate |**A**| and |**B**| in the following cases

1. $\mathbf{a}= \begin{bmatrix} -1 \\ 1 \end{bmatrix}$ $\mathbf{b}= \begin{bmatrix} 2 \\ 5 \end{bmatrix}$ $\mathbf{c}= \begin{bmatrix} -4 \\ -2 \end{bmatrix}$

2. $\mathbf{a}= \begin{bmatrix} 1 \\ 2 \end{bmatrix}$ $\mathbf{b}= \begin{bmatrix} 2 \\ -3 \end{bmatrix}$ $\mathbf{c}= \begin{bmatrix} 1 \\ 2 \end{bmatrix}$

3. $\mathbf{a}= \begin{bmatrix} 3 \\ -2 \end{bmatrix}$ $\mathbf{b}= \begin{bmatrix} 2 \\ 4 \end{bmatrix}$ $\mathbf{c}= \begin{bmatrix} -1 \\ -3 \end{bmatrix}$

Exercise 2

Three vectors **a**, **b** and **c** are used to construct two other vectors **A** and **B** as follows: **A = |b|.a – c** and **B = |b|.c + |c|.a**

$\mathbf{a}= \begin{bmatrix} -2 \\ 1 \end{bmatrix}$ $\mathbf{b}= \begin{bmatrix} \sqrt{7} \\ 3 \end{bmatrix}$ $\mathbf{c}= \begin{bmatrix} -3 \\ 4 \end{bmatrix}$

Find **A** and **B.**

Exercise 3

Find the product **a.b** in the following

1. $\mathbf{a}= \begin{bmatrix} -3 \\ 2 \end{bmatrix}$ $\mathbf{b}= \begin{bmatrix} 2 \\ 5 \end{bmatrix}$

2. $\mathbf{a}= \begin{bmatrix} 1 \\ 1 \end{bmatrix}$ $\mathbf{b}= \begin{bmatrix} -2 \\ -3 \end{bmatrix}$

3. $\mathbf{a}= \begin{bmatrix} 2 \\ -4 \\ 1 \end{bmatrix}$ $\mathbf{b}= \begin{bmatrix} -1 \\ 2 \\ -3 \end{bmatrix}$

Exercise 4

show that $|u+v| \neq |u|+|v|$ where u and v are two 3D vectors,