

**3221 HOMEWORK 1 – DUE in class 1/23**

- 1. Write down the rotation matrices for**
  - a) a rotation around the  $x_1$  axis of  $30^\circ$ , where  $x_2$  has been rotated towards  $x_3$ . Let's call this  $\lambda_1$**
  - b) a rotation around the  $x_2$  axis of  $30^\circ$ , where  $x_3$  has been rotated towards  $x_1$ . Let's call this  $\lambda_2$**
  - c) Taking a point  $P(3,2,1)$  in the unprimed frame, calculate the new coordinates of the point in a frame that has been rotated first using  $\lambda_1$  and then using  $\lambda_2$**
  - d) Repeat part c) using first  $\lambda_2$  and then using  $\lambda_1$**
  
- 2. Given the vectors,  $\mathbf{A}=(1,2,3)$   $\mathbf{B}=(4,5,6)$ ,  $\mathbf{C}=(4,2,1)$ ,  $\mathbf{D}=(7,5,4)$**   
Demonstrate the vector identities that are in the book - equations 1.75, 1.76, 1.77, 1.81, 1.82, 1.83, and 1.84 (that is, calculate the left and right side of the equations to show that they are equal for this one case – in 1.83 and 1.84 just use the final equation).