Physics 3344 **Professor Scalise**
Spring 2000 **Assignment #3**

Due: 8 February 2000

1. Simplify as much as possible: $\vec{A} \times [(\vec{C} \times \vec{A}) \times \vec{B}] \cdot \vec{A}$
2. Marion & Thornton 1.12
3. Marion & Thornton 1.13
4. Marion & Thornton 1.10
5. Show that $\dot{\hat{e}}_\theta = -\hat{e}_r \dot{\theta}$
6. Rotate the vector $\begin{pmatrix} 2 \\ 1 \\ 0 \end{pmatrix}$ about the axis $\begin{pmatrix} \frac{1}{\sqrt{3}} \\ \frac{1}{\sqrt{3}} \\ \frac{1}{\sqrt{3}} \end{pmatrix}$ by 30° counterclockwise as seen by looking down the axis from the tip to the origin.
   (a) Find the 3×3 rotation matrix $\underline{\underline{\lambda}}$.
   (b) Find the image of $\begin{pmatrix} 2 \\ 1 \\ 0 \end{pmatrix}$ under the transformation.
   (c) Verify that the axis does not change direction under the rotation. $\underline{\underline{\lambda}} \frac{1}{\sqrt{3}} \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix} = ?$
   (d) Find $\det(\underline{\underline{\lambda}})$