24.9: Relating Angular Momentum to Angular Velocity

It's easy to check that the angular momentum vector is

$L_i = I_{ij}\Omega_j$

since

$$\mathbf{L} = \sum \vec{r}_n \times m_n \vec{v}_n = \sum m_n \vec{r}_n \times \left(\vec{\Omega} \times \vec{r}_n\right) = \vec{\Omega} \sum m_n r_n^2 - \sum m_n \vec{r}_n \left(\vec{\Omega} \cdot \vec{r}_n\right) = \mathbf{I}\vec{\Omega} \tag{24.9.1}$$

Exercise: verify this by putting in all the suffixes.