

74. This problem involves the vector cross product of vectors lying in the xy plane. For such vectors, if we write $\vec{r} = x\hat{i} + y\hat{j}$, then (using Eq. 3-30) we find

$$\vec{r} \times \vec{p} = (\Delta x p_y - \Delta y p_x) \hat{k} .$$

The momentum components are $p_x = p \cos \theta$ and $p_y = p \sin \theta$ where $p = 2.4$ (SI units understood) and $\theta = 115^\circ$. The mass (0.80 kg) given in the problem is not used in the solution. Thus, with $x = 2.0$, $y = 3.0$ and the momentum components described above, we obtain

$$\vec{\ell} = \vec{r} \times \vec{p} = 7.4 \hat{k} \text{ kg}\cdot\text{m}^2/\text{s} .$$