26. If we write $\vec{r}\,' = x'\,\hat{\mathrm{i}} + y'\,\hat{\mathrm{j}} + z'\,\hat{\mathrm{k}}$, then (using Eq. 3-30) we find $\vec{r}\,' \times \vec{v}$ is equal to

$$(y'v_z - z'v_y)\,\hat{\mathrm{i}} + (z'v_x - x'v_z)\,\hat{\mathrm{j}} + (x'v_y - y'v_x)\,\hat{\mathrm{k}}\ .$$

(a) Here, $\vec{r}\,' = \vec{r}$ where $\vec{r} = 3\,\hat{\mathrm{i}} - 4\,\hat{\mathrm{j}}$. Thus, dropping the primes in the above expression, we set (with SI units understood) $x = 3$, $y = -4$, $z = 0$, $v_x = 30$, $v_y = 60$ and $v_z = 0$. Then (with $m = 2.0$ kg) we obtain $\vec{\ell} = m\,(\vec{r} \times \vec{v}) = 600\,\hat{\mathrm{k}}$ kg·m^2/s.

(b) Now $\vec{r}\,' = \vec{r} - \vec{r}_{\mathrm{o}}$ where $\vec{r}_{\mathrm{o}} = -2\,\hat{\mathrm{i}} - 2\,\hat{\mathrm{j}}$. Therefore, in the above expression, we set $x' = 5$, $y' = -2$, $z' = 0$, $v_x = 30$, $v_y = 60$ and $v_z = 0$. We get $\vec{\ell} = m\,(\vec{r}\,' \times \vec{v}) = 720\,\hat{\mathrm{k}}$ kg·m^2/s.