Question
A force of 2 units acts through the point Q $(1, 2, 0)$, in the direction of the vector $(3, 4, -1)$. Find its moment about the point A $(2, 2, -2)$.

Answer
$\mathbf{M} = \mathbf{r} \times \mathbf{F}$
$\mathbf{r} = \vec{AQ} = \vec{OQ} - \vec{OA} = (1, 2, 0) - (2, 2, -2) = (-1, 0, 2)$
$\mathbf{F} = 2\hat{\mathbf{F}}$ (unit vector in direction of $\mathbf{F}$)
$\mathbf{M} = \mathbf{r} \times \mathbf{F} = \mathbf{r} \times (2\hat{\mathbf{F}}) = 2\mathbf{r} \times \hat{\mathbf{F}}$
$\hat{\mathbf{F}} = \frac{(3,4,1)}{\sqrt{3^2+4^2+(-1)^2}} = \left(\frac{3}{\sqrt{26}}, \frac{4}{\sqrt{26}}, \frac{-1}{\sqrt{26}}\right)$
$\mathbf{r} \times \hat{\mathbf{F}} = \left\{\frac{-8}{\sqrt{26}}, \frac{5}{\sqrt{26}}, \frac{-4}{\sqrt{26}}\right\}$
$\mathbf{M} = \mathbf{r} \times \ = \left(\frac{-16}{\sqrt{26}}, \frac{10}{\sqrt{26}}, \frac{-8}{\sqrt{26}}\right)$