In Fig. 2-25, let the angle between the vector \( \mathbf{A} \) and the hypotenuse \( A' \) in the \( xy \) plane be \( \theta \), and let the angle between the hypotenuse \( A' \) and the \( x \) axis be \( \phi \). By inspection, we see that

\[
A \cos \theta = A' \\
A' \cos \phi = A_x  \\
A' \sin \phi = A_y  \\
A \sin \theta = A_z
\]

By inspection of Fig. 2-26, we see that

\[
A \cos \alpha = A_x \\
A \cos \beta = A_y \\
A \cos \gamma = A_z
\]

Comparing these two observations reveals that

\[
\cos \alpha = \cos \theta \cos \phi \\
\cos \beta = \cos \theta \sin \phi \\
\cos \gamma = \sin \theta
\]

The unit vector pointing in the direction of \( \mathbf{A} \) is then

\[
\mathbf{u}_A = \cos \theta \cos \phi \mathbf{i} + \cos \theta \sin \phi \mathbf{j} + \sin \theta \mathbf{k}
\]

When this method is used for problem 2-125, we find the direction of \( \mathbf{F}_1 \) to be

\[
\mathbf{u}_1 = \cos 30^\circ \sin 30^\circ \mathbf{i} + \cos 30^\circ \cos 30^\circ \mathbf{j} - \sin 30^\circ \mathbf{k}
\]

\[
= \frac{\sqrt{3}}{4} \mathbf{i} + \frac{3}{4} \mathbf{j} - \frac{1}{2} \mathbf{k}
\]

\[
= 0.433 \mathbf{i} + 0.750 \mathbf{j} - 0.500 \mathbf{k}
\]