

3.1 Vector \mathbf{A} starts at point $(1, -1, -3)$ and ends at point $(2, -1, 0)$. Find a unit vector in the direction of \mathbf{A} .

Solution:

$$\mathbf{A} = \hat{\mathbf{x}}(2 - 1) + \hat{\mathbf{y}}(-1 - (-1)) + \hat{\mathbf{z}}(0 - (-3)) = \hat{\mathbf{x}} + \hat{\mathbf{z}}3,$$

$$|\mathbf{A}| = \sqrt{1 + 9} = 3.16,$$

$$\hat{\mathbf{a}} = \frac{\mathbf{A}}{|\mathbf{A}|} = \frac{\hat{\mathbf{x}} + \hat{\mathbf{z}}3}{3.16} = \hat{\mathbf{x}}0.32 + \hat{\mathbf{z}}0.95.$$
