

Problem 1

Find a vector of length 5 that extends along the line through the points $M(1, 4, 0)$ and $N(0, 1, 1)$.

$$\overrightarrow{MN} = \langle -1, -3, 1 \rangle$$

$$|\overrightarrow{MN}| = \sqrt{1 + 9 + 1} = \sqrt{11}$$

$$\frac{5}{\sqrt{11}} \langle -1, -3, 1 \rangle = \left\langle \frac{-5}{\sqrt{11}}, \frac{-15}{\sqrt{11}}, \frac{5}{\sqrt{11}} \right\rangle$$

$$\text{or. } \left\langle \frac{5}{\sqrt{11}}, \frac{15}{\sqrt{11}}, \frac{-5}{\sqrt{11}} \right\rangle$$