

Vectors

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1. If you walk 30 m directly across a football field and then 40 m lengthwise (toward the goalposts), how much further have you walked than if you just walked directly from your starting point to your destination, “as the crow flies”?
2. If you’re relaxing on a beach, how far away is an airplane that is 10 km North and 10 km East, flying at an altitude of 10,000 m?
3. Find the SCALAR PRODUCT of these two vectors: $\vec{\mathbf{A}} = \hat{i} + \hat{j} + \hat{k}$ and $\vec{\mathbf{B}} = \hat{i} - \hat{j} - \hat{k}$
4. What is the UNIT VECTOR in the direction of the vector $\vec{\mathbf{A}} = \hat{i} + 2\hat{j} + 3\hat{k}$?
5. What is the VECTOR PRODUCT of these two vectors: $\vec{\mathbf{A}} = \hat{i} + \hat{j} + \hat{k}$ and $\vec{\mathbf{B}} = \hat{i} - \hat{j} - \hat{k}$?