Copilot

The dot product of two vectors is a way to multiply them to get a scalar (number) result. It's calculated by multiplying the corresponding components of the two vectors and then summing those products. Here's the formula for the dot product of two vectors (\vec{a}) and (\vec{b}):

$$ \vec{a} \cdot \vec{b} = a_1b_1 + a_2b_2 + a_3b_3 + \ldots + a_nb_n $$

This is algebraically equivalent to multiplying the magnitudes of the two vectors and the cosine of the angle (\theta) between them:

$$ \vec{a} \cdot \vec{b} = |\vec{a}| |\vec{b}| \cos(\theta) $$

Where:

- (|\vec{a}|) and (|\vec{b}|) are the magnitudes (lengths) of vectors (\vec{a}) and (\vec{b}) respectively.
- (\theta) is the angle between the two vectors.

If you have the components of the vectors, use the first formula. If you have the magnitudes and the angle, use the second formula.