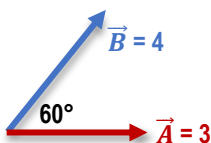


CONCEPT: CALCULATING DOT PRODUCT USING VECTOR COMPONENTS

- You'll need to calculate the dot product $\vec{A} \bullet \vec{B}$ of vectors using unit vector components instead of magnitudes & angles.
 - **Remember:** Dot Product is the multiplication of parallel components, and *always* results in a number!

DOT PRODUCT USING MAG. + ANGLES



$$\vec{A} \bullet \vec{B} = |\vec{A}| |\vec{B}| \cos \theta$$

DOT PRODUCT USING COMPONENTS

$$\vec{A} = A_x \hat{i} + A_y \hat{j} + A_z \hat{k}$$

$$\vec{B} = B_x \hat{i} + B_y \hat{j} + B_z \hat{k}$$

$$\vec{A} \bullet \vec{B} = \underline{\hspace{1cm}} + \underline{\hspace{1cm}} + \underline{\hspace{1cm}}$$

EXAMPLE: Calculate $\vec{A} \bullet \vec{B}$ for each of the following:

a) $\vec{A} = 2\hat{i} + 3\hat{j}$
 $\vec{B} = \hat{i} + 2\hat{j}$

b) $\vec{A} = -3\hat{i} + \hat{j} + 4\hat{k}$
 $\vec{B} = \hat{i} - 2\hat{j}$

PRACTICE: Calculate the dot product between $\vec{A} = (6.6 \hat{i} - 3.4 \hat{j} - 6.4 \hat{k})$ and $\vec{B} = (8.6 \hat{i} + 2.6 \hat{j} - 5.8 \hat{k})$.

Magnitude & Direction

$$\vec{A} \bullet \vec{B} = |A| |B| \cos \theta$$

Unit Vector Components

$$\vec{A} \bullet \vec{B} = A_x B_x + A_y B_y + A_z B_z$$

EXAMPLE: Vector $\vec{A} = 7.2\hat{i} - 3.9\hat{j}$ and $\vec{B} = 2.1\hat{i} + 4.8\hat{j}$. (a) Calculate $\vec{A} \bullet \vec{B}$. (b) What is the angle between $\vec{A}$ & $\vec{B}$?

Magnitude & Direction

$$\vec{A} \bullet \vec{B} = |\vec{A}| |\vec{B}| \cos \theta$$

Unit Vector Components

$$\vec{A} \bullet \vec{B} = A_x B_x + A_y B_y + A_z B_z$$