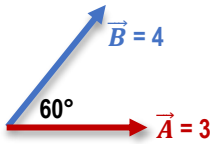
CONCEPT: CALCULATING DOT PRODUCT USING VECTOR COMPONENTS

● 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



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

DOT PRODUCT USING COMPONENTS

$$\vec{A} = A_x\hat{\imath} + A_y\hat{\jmath} + A_z\hat{k}$$

$$\vec{B} = B_x\hat{\imath} + B_y\hat{\jmath} + B_z\hat{k}$$

$$\vec{A} \bullet \vec{B} = \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_$$

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

a) $\vec{A} = 2\hat{\imath} + 3\hat{\jmath}$
$\vec{B} = \hat{\imath} + 2\hat{\jmath}$

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

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

Magnitude & Direction	Unit Vector Components
$\vec{A} \bullet \vec{B} = \lvert A\rvert \lvert B\rvert \cos\theta$	$\vec{A} \bullet \vec{B} = A_xB_x + A_yB_y + A_zB_z$

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	**Unit Vector Components**
$\vec{A} \bullet \vec{B} = \lvert A \rvert \lvert B \rvert \cos\theta$	$\vec{A} \bullet \vec{B} = A_x B_x + A_y B_y + A_z B_z$