

Special Problem 2-3.1

Circle each of the following expressions (there may be more than one!) that tell you with **complete certainty** that:

"Vector **A** is orthogonal to vector **B**"

In other words, circle the expressions—that if true—mean that vectors **A** and **B** **must** be (as opposed to just might be) orthogonal.

All vectors are non-zero.

$$\mathbf{A} \times \mathbf{B} = 0 \quad |\mathbf{A} \times \mathbf{B}| = |\mathbf{A}| |\mathbf{B}| \quad \mathbf{A} \cdot \mathbf{B} = |\mathbf{A}| |\mathbf{B}|$$

$$\mathbf{A} \cdot \mathbf{B} = 0 \quad \mathbf{A} \cdot \mathbf{B} \times \mathbf{A} = 0 \quad |\mathbf{A} \times \mathbf{B}| = \mathbf{A} \cdot \mathbf{B}$$

$$\mathbf{A} = \mathbf{B} \quad \mathbf{A} \cdot \mathbf{C} = \mathbf{B} \cdot \mathbf{C} \quad |\mathbf{A}| = |\mathbf{B}|$$

Give some **justification** for each circled answer