Question 1

Let $\hat{\mathrm{i}}$ denote a unit vector along the x axis, $\hat{\mathrm{j}}$ a unit vector along the y axis, and $\hat{\mathrm{k}}$ denote a unit vector along the z axis. Suppose that

$$\vec{\mathrm{A}} = 3\hat{\mathrm{i}}$$

$$\vec{\mathrm{B}} = 2\hat{\mathrm{j}}$$

Which of the following is true?

1. $\vec{\mathrm{A}} \times \vec{\mathrm{B}} = 0.$
2. $\vec{\mathrm{A}} \times \vec{\mathrm{B}} = 6\hat{\mathrm{i}}.$
3. $\vec{\mathrm{A}} \times \vec{\mathrm{B}} = 6\hat{\mathrm{i}} + 6\hat{\mathrm{j}}.$
4. $\vec{\mathrm{A}} \times \vec{\mathrm{B}} = 6\hat{\mathrm{k}}.$
5. $\vec{\mathrm{A}} \times \vec{\mathrm{B}} = -6\hat{\mathrm{k}}.$

Warm Up Question 1

Consider two displacement vectors in the xy plane. Vector $\vec{\mathrm{A}}$ is $5\,\mathrm{m}$ long and points along the positive x axis. Vector $\vec{\mathrm{B}}$ is 8m long and points along the positive y axis. Is $\vec{\mathrm{A}} \times \vec{\mathrm{B}}$ equal to $\vec{\mathrm{B}} \times \vec{\mathrm{A}}$? Explain your answer.

1. No. Directions are different.
2. No. Cross product is not commutative.
3. Yes. Order does not matter with multiplication.
4. Yes. Order does not matter with the dot product.
5. Yes. They are both zero.

Warm Up Question 2

A disk lies in the xy plane. A string pulls at the *(right – correction)* edge of the disk in the $+y$ direction. What is the direction of the torque vector? Explain your answer.

1. Zero. It pulls straight out.
2. Along $+y$.
3. Along $+z$.
4. Along $-z$.
5. Postive.