

Have you taken CMSE 201?

- A. I have taken CMSE 201.
- B. I am currently taking CMSE 201.
- C. I have not taken CMSE 201, but I plan to.
- D. I have not taken CMSE 201, and don't plan to.

# **HELP SESSIONS (1300 BPS)**

- Wednesdays 7:15-8:30
- Thursdays 6:30-8:30

Either Danny or Bryan will be there for about one hour.

In a typical Cartesian coordinate system, vector **A** lies along the  $+\hat{x}$  direction and vector **B** lies along the  $-\hat{y}$  direction.

What is the direction of  $\mathbf{A} \times \mathbf{B}$ ?

A.  $-\hat{x}$

B.  $+\hat{y}$

C.  $+\hat{z}$

D.  $-\hat{z}$

E. Can't tell

In a typical Cartesian coordinate system, vector **A** lies along the  $+\hat{x}$  direction and vector **B** lies along the  $-\hat{y}$  direction.

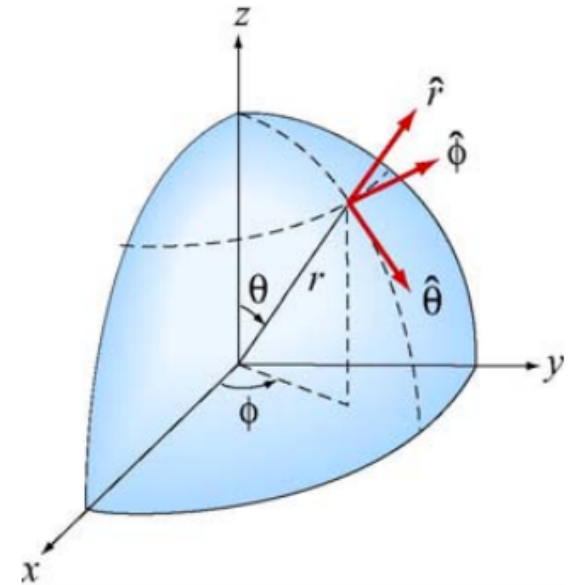
What is the direction of  $\mathbf{B} \times \mathbf{A}$ ?

- A.  $-\hat{x}$
- B.  $+\hat{y}$
- C.  $+\hat{z}$
- D.  $-\hat{z}$
- E. Can't tell

## YOU DERIVE IT

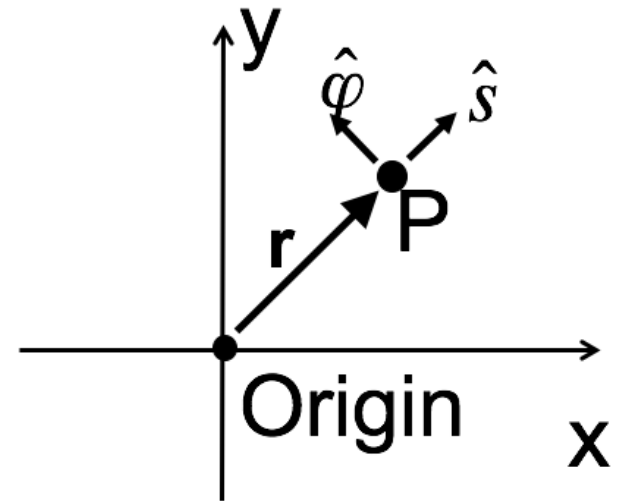
Consider the radial unit vector ( $\hat{r}$ ) in the spherical coordinate system as shown in the figure to the right.

Determine the  $z$  component of this unit vector in the Cartesian ( $x, y, z$ ) system as a function of  $r, \theta, \phi$ .



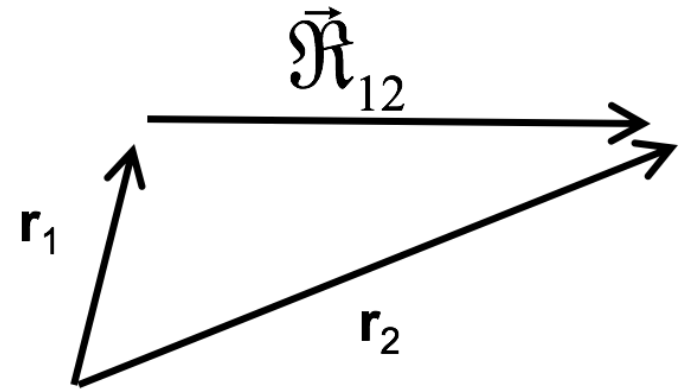
In cylindrical (2D) coordinates, what would be the correct description of the position vector  $\mathbf{r}$  of the point P shown at  $(x, y) = (1, 1)$ ?

- A.  $\mathbf{r} = \sqrt{2}\hat{s}$
- B.  $\mathbf{r} = \sqrt{2}\hat{s} + \pi/4\hat{\phi}$
- C.  $\mathbf{r} = \sqrt{2}\hat{s} - \pi/4\hat{\phi}$
- D.  $\mathbf{r} = \pi/4\hat{\phi}$
- E. Something else entirely

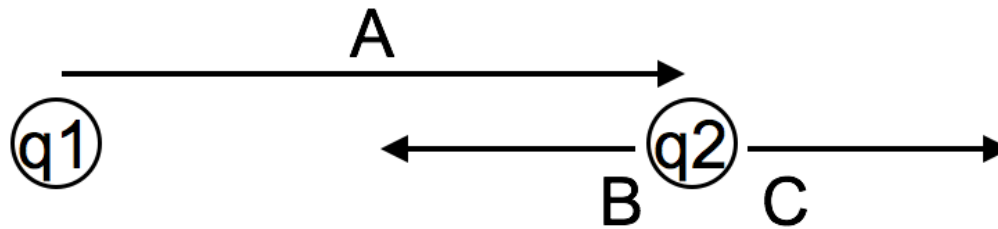


How is the vector  $\mathfrak{R}_{12}$  related to  $\mathbf{r}_1$  and  $\mathbf{r}_2$ ?

- A.  $\mathfrak{R}_{12} = \mathbf{r}_1 + \mathbf{r}_2$
- B.  $\mathfrak{R}_{12} = \mathbf{r}_1 - \mathbf{r}_2$
- C.  $\mathfrak{R}_{12} = \mathbf{r}_2 - \mathbf{r}_1$
- D. None of these



Coulomb's Law:  $\mathbf{F} = \frac{kq_1q_2}{|\mathfrak{R}|^2} \hat{\mathfrak{R}}$  where  $\mathfrak{R}$  is the relative position vector. In the figure,  $q_1$  and  $q_2$  are 2 m apart. Which arrow **can** represent  $\hat{\mathfrak{R}}$ ?



- A. A
- B. B
- C. C
- D. More than one (or NONE) of the above
- E. You can't decide until you know if  $q_1$  and  $q_2$  are the same or opposite charges