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 $\mathbf{A}$ lies along the $+\hat{x}$ direction and vector $\mathbf{B}$ 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 $\mathbf{A}$ lies along the $+\hat{x}$ direction and vector $\mathbf{B}$ lies along the $-\hat{y}$ direction. What is the direction of $\mathbf{B} \times \mathbf{A}$?

A. $-\hat{x}$

B. $+\hat{y}$

C. $+\hat{z}$

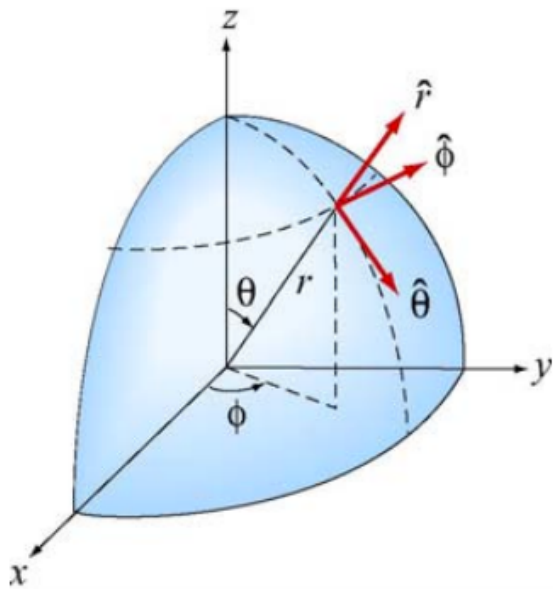
D. $-\hat{z}$

E. Can't tell

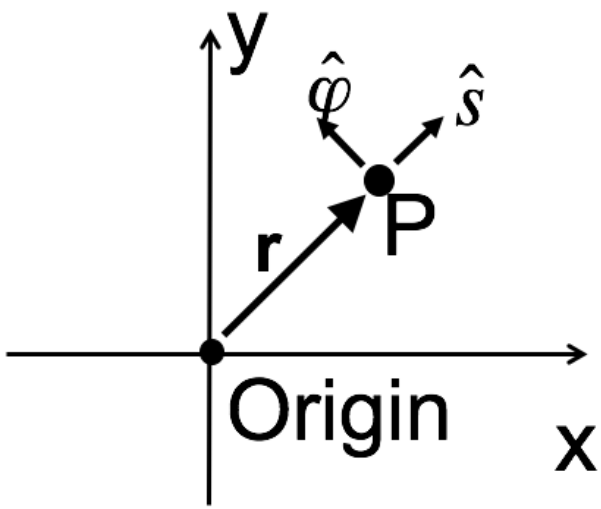
# YOU DERIVE IT

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. $\mathbf{r} = \sqrt{2}\hat{s} + \pi/4\hat{\phi}$

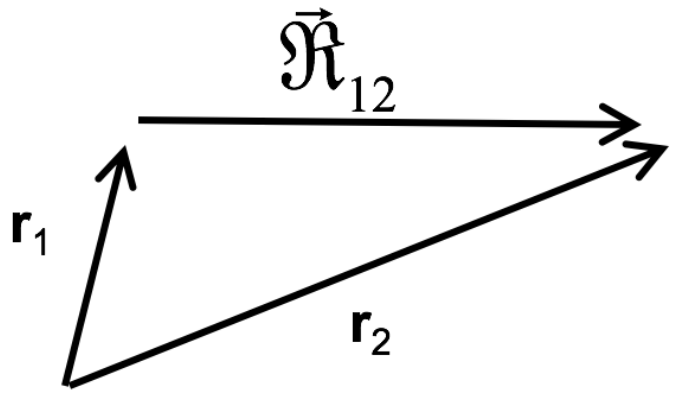
C. $\mathbf{r} = \sqrt{2}\hat{s} - \pi/4\hat{\phi}$

D. $\mathbf{r} = \pi/4\hat{\phi}$

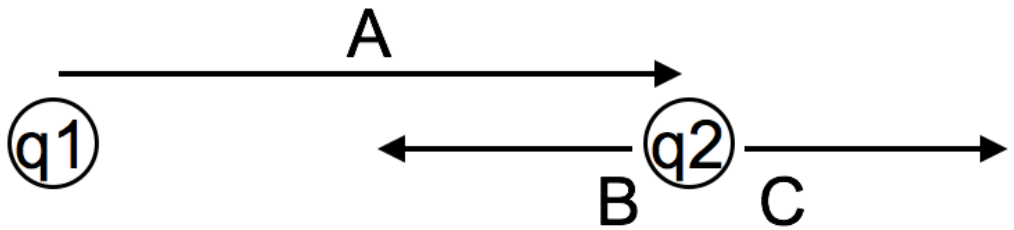
E. Something else entirely

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

You are trying to compute the work done by a force, $\mathbf{F} = a\hat{x} + x\hat{y}$, along the line $y = 2x$ from $\langle 0, 0 \rangle$ to $\langle 1, 2 \rangle$. What is $d\mathbf{l}$?

A. $dl$

B. $dx\ \hat{x}$

C. $dy\ \hat{y}$

D. $2dx\ \hat{x}$

E. Something else

You are trying to compute the work done by a force, $\mathbf{F} = a\hat{x} + x\hat{y}$, along the line $y = 2x$ from $\langle 0, 0 \rangle$ to $\langle 1, 2 \rangle$. Given that $d\mathbf{l} = dx\ \hat{x} + dy\ \hat{y}$, which of the following forms of the integral is correct?

A. $\int_0^1 a\ dx + \int_0^2 x\ dy$

B. $\int_0^1 (a\ dx + 2x\ dx)$

C. $\frac{1}{2} \int_0^2 (a\ dy + y\ dy)$

D. More than one is correct