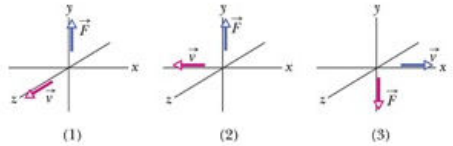
Chapter 03, Concept Question 09

If Vector F = q(vector V x vector B) and vector V is perpendicular to vector B, then what is the direction of vector B in the three situations shown in the figure?

If $\vec{F} = q\left(\vec{v} \times \vec{B}\right)$ and $\vec{v}$ is perpendicular to $\vec{B}$, then what is the direction of $\vec{B}$ in the three situations shown in the figure?

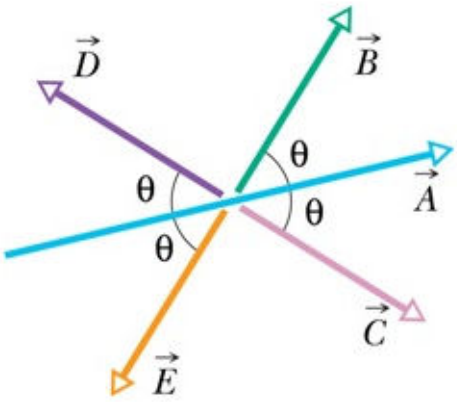


(a) Situation (1), *q* positive:
+x
(b) Situation (1), *q* negative:
-x
(c) Situation (2), *q* positive:
+z
(d) Situation (2), *q* negative:
-z
(e) Situation (3), *q* positive:
+z
(f) Situation (3), *q* negative:
-z

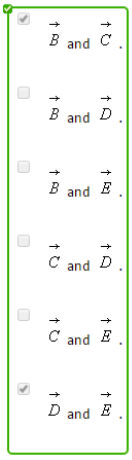
Chapter 03, Concept Question 10

The figure shows vector A and four other vectors that have the same magnitude but differ in orientation.

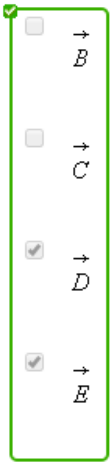
The figure shows vector $\vec{A}$ and four other vectors that have the same magnitude but differ in orientation.



(a) Which pairs of those other four vectors have the same dot product with vector A?



(b) Which of those other four vectors have a negative dot product with vector A?

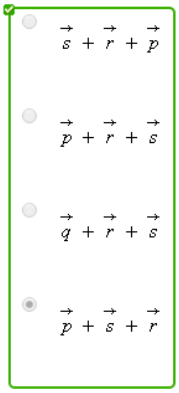


Chapter 03, Concept Question 11

In a game held within a threedimensional maze, you must move your game piece from *start*, at *xyz* coordinates (0, 0, 0), to *finish*, at coordinates (-2 cm, 4 cm, -4 cm). The game piece can undergo only the displacements (in centimeters) given below. If, along the way, the game piece lands at coordinates (-5 cm, -1 cm,-1 cm) or (5 cm, 2 cm,-1 cm), you lose the game. Which displacements and in what sequence will get your game piece to *finish*?

$\vec{p} = -7\hat{i} + 2\hat{j} - 3\hat{k}$ $\vec{r} = 2\hat{i} - 3\hat{j} + 2\hat{k}$

$\vec{q} = 2\hat{i} - \hat{j} + 4\hat{k}$ $\vec{s} = 3\hat{i} + 5\hat{j} - 3\hat{k}$

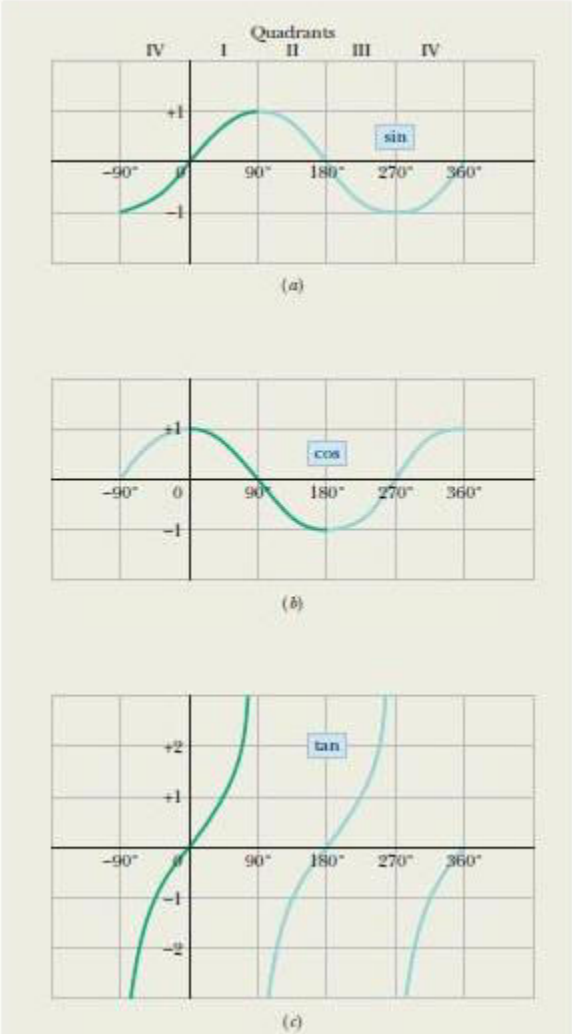


Chapter 03, Concept Question 12

The *x* and *y* components of four vectors a,b,c, and d are given below. For which vectors will your calculator give you the correct angle θ when you use it to find θ with tanθ =ay/ax? Answer first by examining the figure below, and then check your answers with your calculator.

$a_x = 3 \quad a_y = 3 \quad c_x = -3 \quad c_y = -3$

$b_x = -3 \quad b_y = 3 \quad d_x = 3 \quad d_y = -3$



- [x] $\vec{d}$
- [x] $\vec{a}$
- [ ] $\vec{b}$
- [ ] $\vec{c}$

Chapter 03, Concept Question 13

Which of the following are correct (meaningful) vector expressions?

- [ ] (a) $\vec{A} \cdot (\vec{B} \cdot \vec{C})$
- [ ] (b) $\vec{A} \times (\vec{B} \cdot \vec{C})$
- [x] (c) $\vec{A} \cdot (\vec{B} \times \vec{C})$
- [x] (d) $\vec{A} \times (\vec{B} \times \vec{C})$
- [ ] (e) $\vec{A} + (\vec{B} \cdot \vec{C})$
- [x] (f) $\vec{A} + (\vec{B} \times \vec{C})$
- [ ] (g) $5 + \vec{A}$
- [x] (h) $5 + (\vec{B} \cdot \vec{C})$
- [ ] (i) $5 + (\vec{B} \times \vec{C})$
- [ ] (j) $(\vec{A} \cdot \vec{B}) + (\vec{B} \times \vec{C})$