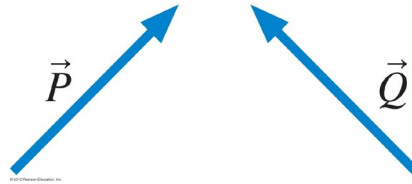


**Quiz #3: Vectors and Motion in Two Dimensions**

**Problem 1** (2 points)

Two vectors appear as in the figure below. Which combination points directly to the left?

- a)  $\vec{P} + \vec{Q}$
- b)  $\vec{P} - \vec{Q}$
- c)  $\vec{Q} - \vec{P}$
- d)  $-\vec{Q} - \vec{P}$
- e) none of the above



**Problem 2** (3 points)

Find the magnitude and direction of the sum of the two displacement vectors  $\vec{A}$  and  $\vec{B}$ . Vector  $\vec{A}$  has components  $A_x = 5.0$  m and  $A_y = -2.5$  m. Vector  $\vec{B}$  has components  $B_x = -9.5$  m and  $B_y = 4.0$  m.

**Problem 3** (5 points)

A football is kicked upward from the ground with an initial velocity of 17.5 m/s at an angle of  $41.0^\circ$  above the horizontal. **(a)** How long a time does it take for the ball to reach its maximum height? **(b)** What is the ball's maximum height? **(c)** What is the ball's speed at its maximum height?