


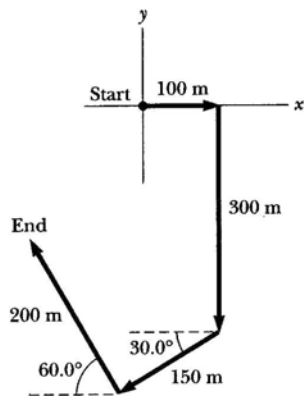
**1.**  The polar coordinates of a point are  $r = 5.50$  m and  $\theta = 240^\circ$ . What are the Cartesian coordinates of this point?

9. A plane flies from base camp to lake A, 280 km away, in a direction of  $20.0^\circ$  north of east. After dropping off supplies it flies to lake B, which is 190 km at  $30.0^\circ$  west of north from lake A. Graphically determine the distance and direction from lake B to the base camp.
25. While exploring a cave, a spelunker starts at the entrance and moves the following distances. She goes 75.0 m north, 250 m east, 125 m at an angle  $30.0^\circ$  north of east, and 150 m south. Find the resultant displacement from the cave entrance.

**31.** Consider the two vectors  $\mathbf{A} = 3\hat{\mathbf{i}} - 2\hat{\mathbf{j}}$  and  $\mathbf{B} = -\hat{\mathbf{i}} - 4\hat{\mathbf{j}}$ . Calculate (a)  $\mathbf{A} + \mathbf{B}$ , (b)  $\mathbf{A} - \mathbf{B}$ , (c)  $|\mathbf{A} + \mathbf{B}|$ , (d)  $|\mathbf{A} - \mathbf{B}|$ , and (e) the directions of  $\mathbf{A} + \mathbf{B}$  and  $\mathbf{A} - \mathbf{B}$ .

34. In a game of American football, a quarterback takes the ball from the line of scrimmage, runs backward a distance of 10.0 yards, and then sideways parallel to the line of scrimmage for 15.0 yards. At this point, he throws a forward pass 50.0 yards straight downfield perpendicular to the line of scrimmage. What is the magnitude of the football's resultant displacement?
36. A novice golfer on the green takes three strokes to sink the ball. The successive displacements are 4.00 m to the north, 2.00 m northeast, and 1.00 m at  $30.0^\circ$  west of south. Starting at the same initial point, an expert golfer could make the hole in what single displacement?
- 47.** Vector  $\mathbf{A}$  has a negative  $x$  component 3.00 units in length and a positive  $y$  component 2.00 units in length. (a) Determine an expression for  $\mathbf{A}$  in unit-vector notation. (b) Determine the magnitude and direction of  $\mathbf{A}$ . (c) What vector  $\mathbf{B}$  when added to  $\mathbf{A}$  gives a resultant vector with no  $x$  component and a negative  $y$  component 4.00 units in length?

**P3.59.** A person going for a walk follows the path shown in Fig. P3.59. The total trip consists of four straight-line paths. At the end of the walk, what is the person's resultant displacement measured from the starting point?



**Figure P3.59**