

Problem Set 2

Vectors

1. A fly lands on one wall of a room. The lower left-hand corner of the wall is selected as the origin of a two-dimensional Cartesian coordinate system. If the fly is located at the point having coordinates (2.00, 1.00) m, (a) how far is it from the corner of the room? (b) What is its location in polar coordinates?
2. A person walks 25.0° north of east for 3.10 km. How far would she have to walk due north and due east to arrive at the same location?
3. A displacement vector lying in the xy plane has a magnitude of 50.0 m and is directed at an angle of 120° to the positive x axis. What are the rectangular components of this vector?
4. A force \mathbf{F}_1 of magnitude 6.00 N acts at the origin in a direction 30.0° above the positive x axis. A second force \mathbf{F}_2 of magnitude 5.00 N acts at the origin in the direction of the positive y axis. Find graphically and by calculation the magnitude and direction of the resultant force $\mathbf{F}_1 + \mathbf{F}_2$.
5. Each of the displacement vectors \mathbf{A} and \mathbf{B} shown in Fig. has a magnitude of 3.00 m. Find graphically and by calculation (a) $\mathbf{A} + \mathbf{B}$, (b) $\mathbf{A} - \mathbf{B}$

