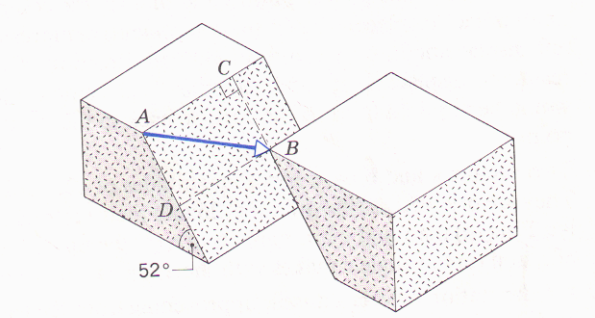
3-31

Use the definition of scalar product, $\vec{a}.\vec{b} = ab\cos\theta$, and the fact that $\vec{a}.\vec{b} = a_x b_x + a_y b_y + a_z b_z$ to calculate the angle between the two vectors given by $\vec{a} = 3.0\hat{i} + 3.0\hat{j} + 3.0\hat{k}$ and $\vec{b} = 2.0\hat{i} + 1.0\hat{j} + 3.0\hat{k}$.

3.37

Rock faults are ruptures along which opposite faces of rock have moved past each other, parallel to the fracture surface. Earthquakes often accompany this movement. In Fig. 24 points *A* and *B* coincided before faulting. The component of the net displacement *AB* parallel to the horizontal surface fault line is called the *strike-slip (A C).* The component of the net displacement along the steepest line of the fault plane is the *dip-slip (AD). (a)* What is the net shift if the strike-slip is 22 m and the dip-slip is 17 m? (*b)* If the fault plane is inclined 52^0 to the horizontal, what is the net *vertical* displacement of *B* as a result of the faulting in *(a)?*



3.49

Here are two vectors:

$\vec{a} = (4.0m)\hat{i} - (3.0m)\hat{j}$ and $\hat{b} = (6.0m)\hat{i} - (8.0m)\hat{j}$.

What are (a) the magnitude and (b) the angle (relative to $\hat{i}$) of $\vec{a}$? What are (c) the magnitude and (d) the angle of $\vec{b}$? What are (e) the magnitude and (f) the angle of $\vec{a} + \vec{b}$; (g) the magnitude and (h) angle of $\vec{b} - \vec{a}$; and (i) the magnitude and (j) the angle of $\vec{a} - \vec{b}$? (k) What is the angle between the directions of $\vec{b} - \vec{a}$ and $\vec{a} - \vec{b}$?