

46. (a) By the right-hand rule,  $\vec{A} \times \vec{B}$  points upward if  $\vec{A}$  points north and  $\vec{B}$  points west. If  $\vec{A}$  and  $\vec{B}$  have magnitude = 1 then, by Eq. 3-27, the result also has magnitude equal to 1.
- (b) Since  $\cos 90^\circ = 0$ , the scalar dot product between perpendicular vectors is zero. Thus,  $\vec{A} \cdot \vec{B} = 0$  is  $\vec{A}$  points down and  $\vec{B}$  points south.
- (c) By the right-hand rule,  $\vec{A} \times \vec{B}$  points south if  $\vec{A}$  points east and  $\vec{B}$  points up. If  $\vec{A}$  and  $\vec{B}$  have unit magnitude then, by Eq. 3-27, the result also has unit magnitude.
- (d) Since  $\cos 0^\circ = 1$ , then  $\vec{A} \cdot \vec{B} = AB$  (where  $A$  is the magnitude of  $\vec{A}$  and  $B$  is the magnitude of  $\vec{B}$ ). If, additionally, we have  $A = B = 1$ , then the result is 1.
- (e) Since  $\sin 0^\circ = 0$ ,  $\vec{A} \times \vec{B} = 0$  if both  $\vec{A}$  and  $\vec{B}$  point south.