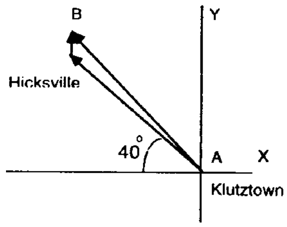
Chapter **01** (Bueche & Jerde) ***Introduction***

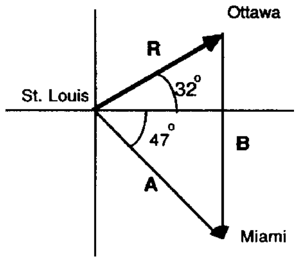
P**28**. a = 4.75 m, b = 5.50 m & c = 2.35 m. The diagonal length from ceiling corner to the opposite floor corner is $D = (a^2+b^2+c^2)^{1/2}$ = 7.64 m. The diagonal length on the floor is $L = (a^2+b^2)^{1/2}$ = 7.27 m and $\theta = \cos^{-1}(L/D)$ = 18.0°.

P**18**. $\vec{R}_1$ = 220 km $(-\cos 40°\,\hat{i} + \sin 40°\,\hat{j})$ & $\vec{R}_2$ = 30 km $\hat{j}$. $\vec{R} = -(\vec{R}_1 + \vec{R}_2) = (169\,\hat{i} - 171\,\hat{j})$ km or R = 240 km, 46° south of east.



P**29**. $\vec{R} = \vec{A} + \vec{B}$: 20 = 40cos225°+B_x & 0 = 40sin225°+B_y ⇒ B_x = 48.0 m & B_y = 28.0 m .

P**19**. $\vec{R}_1$ = 780 km $(\cos 47°\,\hat{i} - \sin 47°\,\hat{j})$ & $\vec{R}_2$ = 2060 km $\hat{j}$. $\vec{R} = (\vec{R}_1 + \vec{R}_2) = (1214\,\hat{i} + 758\,\hat{j})$ km or $\vec{R}$ = 1431 km, 32° north of east.



P**30**. A = 49 cm, θ_A = 42° & B = 32 cm, θ_B = 115°. $\vec{A} + \vec{B} = (22.9\,\hat{i} + 61.8\,\hat{j})$ cm and $\vec{B} - \vec{A} = -(49.9\,\hat{i} + 3.80\,\hat{j})$ cm.

P**32**. Choosing east as +x, north as +y, and up as +z directions. A = 6.5 ft, θ_A = –65° & B = 2.5 ft, θ_B = –25°. $\vec{R} = \vec{A} + \vec{B}$: R_x = –6.50cos65.0° = 2.75 (ft), R_y = 2.50cos25.0° = 2.30 (ft), and R_z = 6.50sin65.0°–2.50sin25.0° = 4.80 (ft). $R = (2.75^2+2.30^2+4.80^2)^{1/2}$ = 6.00 (ft), $\theta_f = \tan^{-1}[R_z/(R_x^2+R_y^2)]^{1/2}$ = 53.0°, and $\theta_n = \tan^{-1}[R_y/(R_x^2+R_z^2)]$ = 22.6°.

P**34**. Taking east as +x and north as +y, we have R = 4.3 mi and R_x = –1.6 mi. $R_y = \pm(4.3^2-1.6^2)^{1/2}$ = 4.00 (mi), $\theta = \sin^{-1}(R_x/R\}$= 21.8°. Thus the boat travels either 21.8° west of north or west of south.