83. (First problem in **Cluster 1**)

(a) Using the coordinate system and force resolution shown in the textbook Figure 5-18(c), we apply Newton's second law along the x axis

$$-mg\sin\theta = ma$$

where $\theta = 30.0°$. Thus, $a = -4.9\,\mathrm{m/s^2}$. The magnitude of the acceleration, then, is $4.9\,\mathrm{m/s^2}$.

(b) Applying Newton's second law along the y axis (where there is no acceleration), we have

$$N - mg\cos\theta = 0\ .$$

Thus, with $m = 10.0$ kg, we obtain $N = 84.9$ N.