

### Exercise 8-17

Force diagram is same as that for Exercise 8-16, with  $\vec{F}_f$  replaced by  $\vec{F}_{\max}$ , where  $F_{\max} = \mu_s N$ .

If the skier starts moving without pushing,

$$\Sigma F_x = m a_x > 0$$

$$\therefore mg \sin \theta - F_{\max} > 0$$

$$\text{But } F_{\max} = \mu_s N$$

$$\text{and, as in Exercise 8-16, } N = mg \cos \theta$$

$$\therefore mg \sin \theta - \mu_s mg \cos \theta > 0$$

$$\therefore \sin \theta > \mu_s \cos \theta$$

$$\therefore \tan \theta > \mu_s \text{ or } \mu_s < \tan \theta$$

$$\therefore \mu_s < \tan 15.0^\circ$$

$$\therefore \mu_s < 0.268$$