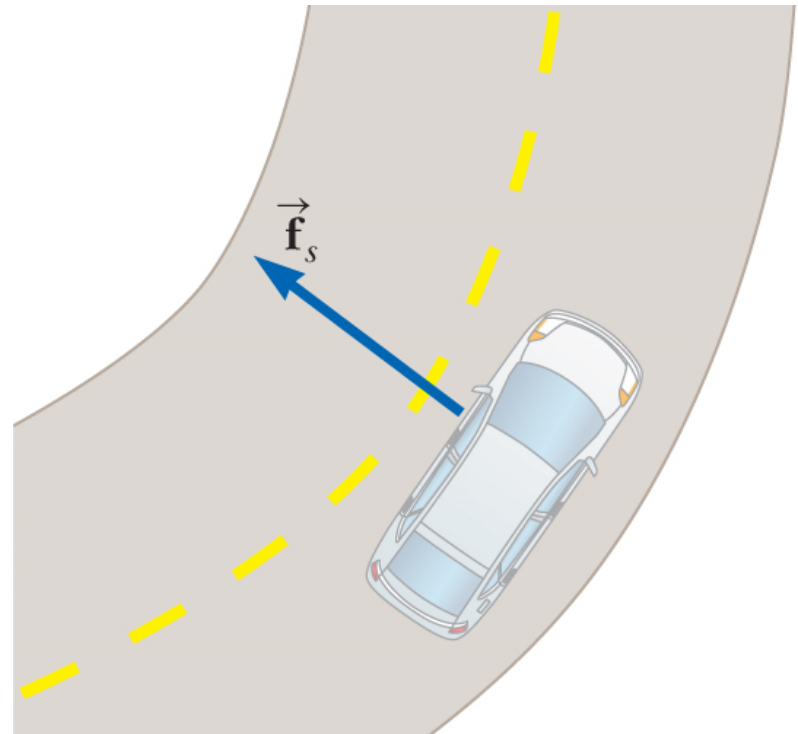# Example 6.3:
What Is the Maximum Speed of the Car?

A 1 500-kg car moving on a flat, horizontal road negotiates a curve as shown in the overhead view in the figure. If the radius of the curve is 35.0 m and the coefficient of static friction between the tires and dry pavement is 0.523, find the maximum speed the car can have and still make the turn successfully.
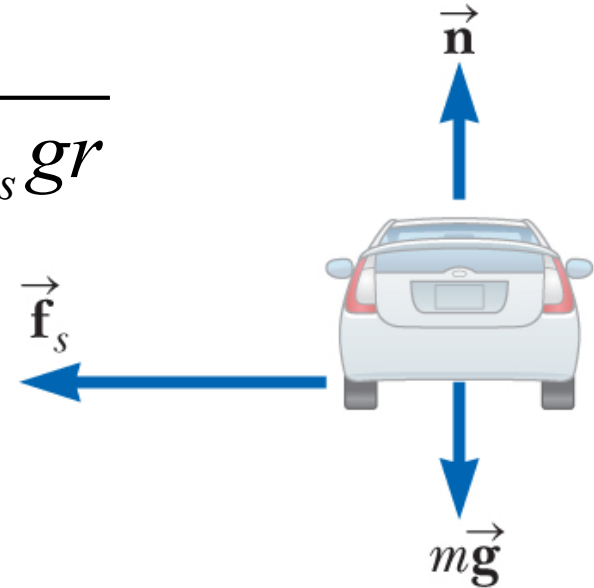
What Is the Maximum Speed of the Car?

$$f_{s,max} = \mu_s n = m\frac{v_{max}^2}{r}$$

$$\sum F_y = 0 \Rightarrow n - mg = 0 \Rightarrow n = mg$$

$$v_{max} = \sqrt{\frac{\mu_s n r}{m}} = \sqrt{\frac{\mu_s mgr}{m}} = \sqrt{\mu_s gr}$$

$\vec{n}$

$\vec{f}_s$

$m\vec{g}$

$$v_{max} = \sqrt{(0.523)(9.80 \text{ m/s}^2)(35.0 \text{ m})} = 13.4 \text{ m/s}$$