

64. At the top of the hill the vertical forces on the car are the upward normal force exerted by the ground and the downward pull of gravity. Designating  $+y$  downward, we have

$$mg - N = \frac{mv^2}{R}$$

from Newton's second law. To find the greatest speed without leaving the hill, we set  $N = 0$  and solve for  $v$ :

$$v = \sqrt{gR} = \sqrt{(9.8)(250)} = 49.5 \text{ m/s}$$

which converts to  $49.5(3600/1000) = 178 \text{ km/h}$ .