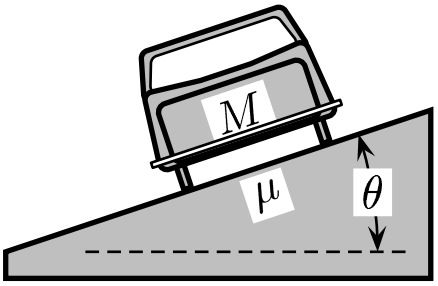
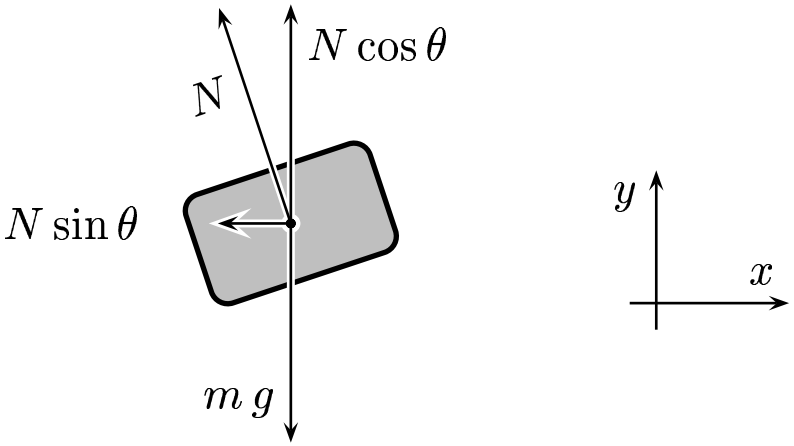
A car travels along a slippery curve. The radius of curvature of the road is R. The banking angle is θ. The speed of the car is at it's critical speed so that the frictional force is 0. Let x be in the horizontal plane, y be vertical, and let $F_c = m\,\dfrac{v^2}{R}$ be the centripetal acceleration.





Choose the correct pair of relations below.

A) $N_x = N\,\sin\theta = F_c$ and $N_y = N\,\sin\theta = m\,g$.

B) $N_x = N\,\cos\theta = F_c$ and $N_y = N\,\cos\theta = m\,g$.

C) $N_x = N\,\sin\theta = F_c$ and $N_y = N\,\cos\theta = m\,g$.

D) $N_x = N\,\cos\theta = F_c$ and $N_y = N\,\sin\theta = m\,g$.

Using the free-body diagram, the $F = m\,a$ equation in the horizontal direction is

$$N\,\sin\theta + f\,\cos\theta = m\,\frac{v}{R^2}\,,$$

where the frictional force $f = 0$.

By inspection,

Answer **C**.