

42. The magnitude of the acceleration of the cyclist as it moves along the horizontal circular path is given by v^2/R , where v is the speed of the cyclist and R is the radius of the curve.

- (a) The horizontal component of Newton's second law is $f = mv^2/R$, where f is the static friction exerted horizontally by the ground on the tires. Thus,

$$f = \frac{(85.0)(9.00)^2}{25.0} = 275 \text{ N} .$$

- (b) If N is the vertical force of the ground on the bicycle and m is the mass of the bicycle and rider, the vertical component of Newton's second law leads to $N = mg = 833 \text{ N}$. The magnitude of the force exerted by the ground on the bicycle is therefore

$$\sqrt{f^2 + N^2} = \sqrt{275^2 + 833^2} = 877 \text{ N} .$$