39. The force diagrams in Fig. 5-18 are helpful to refer to. In adapting Fig. 5-18(b) to this problem, the normal force $\vec{N}$ and the tension $\vec{T}$ should be labeled $F_{\mathrm{m,r}_y}$ and $F_{\mathrm{m,r}_x}$, respectively, and thought of as the y and x components of the force $\vec{F}_{\mathrm{m,r}}$ exerted by the motorcycle on the rider. We adopt the coordinates used in Fig. 5-18 and note that they are not the usual horizontal and vertical axes.

(a) Since the net force equals ma, then the magnitude of the net force on the rider is $(60.0\,\mathrm{kg})(3.0\,\mathrm{m/s^2}) = 1.8 \times 10^2$ N.

(b) We apply Newton's second law to the x axis:

$$F_{\mathrm{m,r}_x} - mg\sin\theta = ma$$

where $m = 60.0$ kg, $a = 3.0$ m/s^2, and $\theta = 10°$. Thus, $F_{\mathrm{m,r}_x} = 282$ N. Applying it to the y axis (where there is no acceleration), we have

$$F_{\mathrm{m,r}_y} - mg\cos\theta = 0$$

which produces $F_{\mathrm{m,r}_y} = 579$ N. Using the Pythagorean theorem, we find

$$\sqrt{F_{\mathrm{m,r}_x}^2 + F_{\mathrm{m,r}_y}^2} = 644 \text{ N} .$$

Now, the magnitude of the force exerted on the rider by the motorcycle is the same magnitude of force exerted by the rider on the motorcycle, so the answer is 6.4×10^2 N.