81. (a) Since $\vec{F}_{\text{net}} = \frac{d\vec{p}}{dt}$ (Eq. 9-23), we read from value of F_x (see graph) that the rate of change of momentum is 4.0 kg·m/s^2 at $t = 3.0$ s.

(b) The impulse, which causes the change in momentum, is equivalent to the area under the curve in this graph (see Eq. 10-3). We break the area into that of a triangle $\frac{1}{2}(2.0\,\text{s})(4.0\,\text{N})$ plus that of a rectangle $(1.0\,\text{s})(4.0\,\text{N})$, which yields a total of 8.0 N·s. Since the car started from rest, its momentum at $t = 3.0$ s must therefore be 8.0 kg·m/s.