3. From the time dilation equation $\Delta t = \gamma \Delta t_0$ (where Δt_0 is the proper time interval, $\gamma = 1/\sqrt{1-\beta^2}$, and $\beta = v/c$), we obtain

$$\beta = \sqrt{1 - \left(\frac{\Delta t_0}{\Delta t}\right)^2} \ .$$

The proper time interval is measured by a clock at rest relative to the muon. Specifically, $\Delta t_0 = 2.2\,\mu$s. We are also told that Earth observers (measuring the decays of moving muons) find $\Delta t = 16\,\mu$s. Therefore,

$$\beta = \sqrt{1 - \left(\frac{2.2\,\mu\text{s}}{16\,\mu\text{s}}\right)^2} = 0.9905 \ .$$

The muon speed is $v = \beta c = 0.9905(2.998 \times 10^8\ \text{m/s}) = 2.97 \times 10^8\ \text{m/s}$.