$$v_{\mathrm{t}} = r\omega = 1.0(2.0t)\ \mathrm{m/s}$$

$$a_{\mathrm{c}} = \frac{v_t^2}{r} = \frac{(2.0t)^2}{1.0\ \mathrm{m}} = 4.0t^2\ \mathrm{m/s^2}$$

$$a_{\mathrm{t}}(t) = r\alpha(t) = r\frac{d\omega}{dt} = 1.0\ \mathrm{m}(2.0) = 2.0\ \ \mathrm{m/s^2}.$$