

85. (a) Using $T = 1 \text{ yr} = 3.16 \times 10^7 \text{ s}$ for the time to make one full revolution (or $2\pi \text{ rad}$), we obtain

$$\omega = \frac{2\pi}{T} = \frac{2\pi}{3.16 \times 10^7} = 2.0 \times 10^{-7} \text{ rad/s} .$$

- (b) The radius r of Earth's orbit can be found in Appendix C or the inside front cover. Eq. 11-18 gives

$$v = \omega r = (2.0 \times 10^{-7} \text{ rad/s})(1.49 \times 10^{11} \text{ m}) = 3.0 \times 10^4 \text{ m/s} .$$

- (c) The (radial, or centripetal) acceleration is

$$a = \omega^2 r = (2.0 \times 10^{-7} \text{ rad/s})^2 (1.49 \times 10^{11} \text{ m}) = 5.9 \times 10^{-3} \text{ m/s}^2 .$$

The direction of \vec{a} is toward the sun.