

**31.2. Solve:** (a) From Table 30.1, the resistivity of aluminum is  $\rho = 2.8 \times 10^{-8} \Omega \text{ m}$ . From Equation 31.3, the length  $L$  of a wire with a cross-sectional area  $A$  and having a resistance  $R$  is

$$L = \frac{AR}{\rho} = \frac{(10 \times 10^{-6} \text{ m})^2 (1000 \Omega)}{2.8 \times 10^{-8} \Omega \text{ m}} = 3.57 \text{ m}$$

(b) The number of turns is the length of the wire divided by the circumference of one turn. Thus,

$$\frac{3.57 \text{ m}}{2\pi(1.5 \times 10^{-3} \text{ m})} = 379$$