

85. Using Eq. 16-12, we find  $\omega = \sqrt{k/m} = 10 \text{ rad/s}$ . We also use  $v_m = x_m\omega$  and  $a_m = x_m\omega^2$ .

- (a) The amplitude (meaning “displacement amplitude”) is  $x_m = v_m/\omega = 3/10 = 0.30 \text{ m}$ .
- (b) The acceleration-amplitude is  $a_m = (0.30)(10)^2 = 30 \text{ m/s}^2$ .
- (c) One interpretation of this question is “what is the most negative value of the acceleration?” in which case the answer is  $-a_m = -30 \text{ m/s}^2$ . Another interpretation is “what is the smallest value of the absolute-value of the acceleration?” in which case the answer is zero.
- (d) Since the period is  $T = 2\pi/\omega = 0.628 \text{ s}$ . Therefore, seven cycles of the motion requires  $t = 7T = 4.4 \text{ s}$ .