70. (a) Sample Problem 16-7 gives $b = 0.070$ kg/s, $m = 0.25$ kg and $k = 85$ N/m, and notes that $b \ll \sqrt{km}$ which implies $\omega' \approx \omega = \sqrt{k/m}$ (and, as will be important below, $b/m \ll \omega$). Thus, from Eq. 16-40, we find

$$v = \frac{dx}{dt} = x_m \left(\frac{-b}{2m}\right) e^{-bt/2m} \cos(\omega t + \phi) - \omega x_m e^{-bt/2m} \sin(\omega t + \phi)$$

where the first term is considered negligible ($b/2m \ll \omega$) and we write

$$v \approx -\omega x_m e^{-bt/2m} \sin(\omega t + \phi) \quad \Longrightarrow \quad v_m = \omega x_m e^{-bt/2m} \ .$$

Thus, the ratio of maximum values of forces is

$$\frac{F_{m\,\text{damp}}}{F_{m\,\text{spring}}} = \frac{b v_m}{k x_m e^{-bt/2m}} \approx \frac{b\omega}{k} = \frac{b}{\sqrt{km}} = 0.015 \ .$$

(b) The ratio of force amplitudes found in part (a) displays no time dependence, implying there is no (or, since approximations were made, approximately no) change in the ratio as the system undergoes further oscillations.