80. We refer to the discussion in the textbook (see Sample Problem 10-2, which uses the same notation that we use here) for many of the important details in the reasoning. Here we only present the primary computational step (using SI units).

(a) The bullet's initial kinetic energy is

$$\frac{1}{2}mv^2 = \frac{1}{2}m\left(\frac{m+M}{m}\sqrt{2gh}\right)^2 = \frac{m+M}{m}U_f$$

where $U_f = (m+M)gh$ is the system's final potential energy (equal to its total mechanical energy since its speed is zero at height h). Thus,

$$\frac{U_f}{\frac{1}{2}mv^2} = \frac{m}{m+M} = \frac{0.008}{7.008} = 0.00114 \ .$$

(b) The fraction $m/(m+M)$ shown in part (a) has no v-dependence. The answer remains the same.

(c) As we found in part (a), the fraction is $m/(m+M)$. The numerical value of h given in the problem statement has not been used in this solution.