Extra Homework

Your Name:_________________________

Your Section:_________________________

No Name = No grade
No Section = No grade

An engineer is designing a spring to be placed at the bottom of an elevator shaft. If the elevator cable should happen to break when the elevator is at a height $h$ above the top of the spring, calculate the value that the spring constant $k$ should have so that passengers undergo an acceleration of no more than $3.0g$ when brought to rest. Let $M$ be the total mass of the elevator and passengers.

*Hint:* The answer is one of the choices on the back.

*Warning:* Show your work!

Answer:_________________________
(a) $k = 3Mg$
(b) $k = 8Mg$
(c) $k = 3Mgh$
(d) $k = 12Mgh$
(e) $k = 24Mgh$
(f) $k = 3\frac{Mg}{h}$
(g) $k = 4\frac{Mg}{h}$
(h) $k = 12\frac{Mg}{h}$
(i) $k = \frac{Mg}{h}\sqrt{1 + \frac{2h}{Mg}}$
(j) $k = \frac{3Mg}{h}\sqrt{1 + \frac{2h}{Mg}}$
(k) $k = \frac{Mg}{h}\left(1 + \sqrt{1 + \frac{2h}{Mg}}\right)$
(l) $k = \frac{2Mg}{h}\left(1 + \sqrt{1 + \frac{2h}{Mg}}\right)$
(m) $k = \frac{3Mg}{h}\left(1 + \sqrt{1 + \frac{2h}{Mg}}\right)$
(n) $k = \frac{3Mg}{h}\left(1 + \sqrt{1 + \frac{2h}{3Mg}}\right)$