

56. (a) The term “deceleration” means the acceleration vector is in the direction opposite to the velocity vector (which the problem tells us is downward). Thus (with $+y$ upward) the acceleration is $a = +2.4 \text{ m/s}^2$. Newton’s second law leads to

$$T - mg = ma \implies m = \frac{T}{g + a}$$

which yields $m = 7.3 \text{ kg}$ for the mass.

- (b) Repeating the above computation (now to solve for the tension) with $a = +2.4 \text{ m/s}^2$ will, of course, leads us right back to $T = 89 \text{ N}$. Since the direction of the velocity did not enter our computation, this is to be expected.