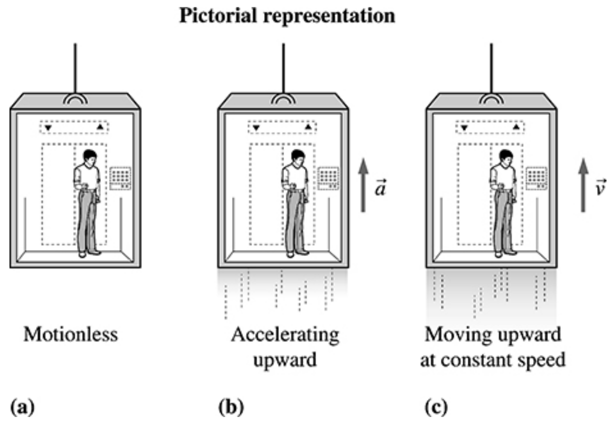
6.15. Model: We assume that the passenger is a particle subject to two vertical forces: the downward pull of gravity and the upward push of the elevator floor. We can use one-dimensional kinematics and Equation 6.10.
Visualize:



Solve: **(a)** The weight is

$$w = mg\left(1+\frac{a_y}{g}\right) = mg\left(1+\frac{0}{g}\right) = mg = (60\text{ kg})(9.80\text{ m/s}^2) = 590\text{ N}$$

(b) The elevator speeds up from $v_{0y} = 0$ m/s to its cruising speed at $v_y = 10$ m/s. We need its acceleration before we can find the apparent weight:

$$a_y = \frac{\Delta v}{\Delta t} = \frac{10\text{ m/s} - 0\text{ m/s}}{4.0\text{ s}} = 2.5\text{ m/s}^2$$

The passenger's weight is

$$w = mg\left(1+\frac{a_y}{g}\right) = (590\text{ N})\left(1+\frac{2.5\text{ m/s}^2}{9.80\text{ m/s}^2}\right) = (590\text{ N})(1.26) = 740\text{ N}$$

(c) The passenger is no longer accelerating since the elevator has reached its cruising speed. Thus, $w = mg = 590$ N as in part (a).

Assess: The passenger's weight is the gravitational force on the passenger in parts (a) and (c), since there is no acceleration. In part (b), the elevator must not only support the gravitational force but must also accelerate him upward, so it's reasonable that the floor will have to push up harder on him, increasing his weight.