

Question #36688

stand on bathroom scale in an elevator. Though your normal weight is 545 N, the scale at the moment reads 651 N. Calculate the magnitude of the elevator's acceleration.

Solution:

Let

$$P_0 = 545 \text{ N}$$

$$P_a = 651 \text{ N}$$

$$a = ?$$

$P_a = m(g + a)$, where g is the acceleration due the gravity, m is the mass

$$a = \frac{P_a - mg}{m}$$

Such as $P_0 = mg$

$$a = g\left(\frac{P_a}{P_0} - 1\right)$$

$$a = 9.8\left(\frac{651}{545} - 1\right) = 1.9 \text{ m/s}^2$$

Answer: 1.9 m/s²