

Correction on lbs

Let $lb = \text{pound as unit of force}$

$lbm = \text{pound as unit of mass}$

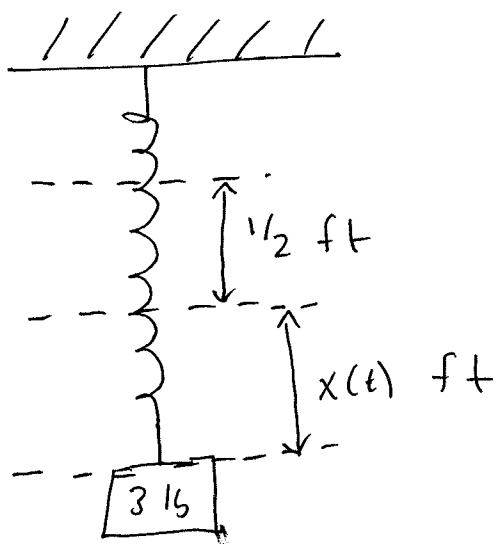
A 1 lbm mass experiences a 1 lb force due to gravity.

Acceleration due to gravity is 32 ft/sec^2 . So $F = ma$

$$\Rightarrow 1 \text{ lb} = (1 \text{ lbm})(32 \text{ ft/sec}^2)$$

$$\Rightarrow \frac{lb}{lbm} = 32 \text{ ft/sec}^2$$

Spring Problem



$$K \cdot \frac{1}{2} \text{ ft} = 3 \text{ lb}$$

$$K = 6 \text{ lb/ft}$$

$$F = ma \Rightarrow$$

$$3 \text{ lb} - 6 \frac{\text{lb}}{\text{ft}} \left(x + \frac{1}{2}\right) \text{ ft} = 3 \text{ lbm} \cdot x'' \frac{\text{ft}}{\text{sec}^2}$$

$$x'' \frac{\text{ft}}{\text{sec}^2} + 2 \frac{\text{lb}}{\text{lbm}} \cdot x = 0$$

$$x'' \frac{\text{ft}}{\text{sec}^2} + 64 x \frac{\text{ft}}{\text{sec}^2} = 0$$

\Rightarrow

$$\boxed{x'' + 64x = 0}$$