

PROBLEM 1-6

Statement: Express a 100-kg mass in units of slugs, blobs, and lbm. How much does this mass weigh?

Units: $\text{blob} := \frac{\text{lbf} \cdot \text{sec}^2}{\text{in}}$

Given: $M := 100 \text{ kg}$

Assumptions: The mass is at sea-level and the gravitational acceleration is

$$g = 32.174 \cdot \frac{\text{ft}}{\text{sec}^2} \quad \text{or} \quad g = 386.089 \cdot \frac{\text{in}}{\text{sec}^2} \quad \text{or} \quad g = 9.807 \cdot \frac{\text{m}}{\text{sec}^2}$$

Solution: See Mathcad file P0106.

1. Convert mass units by assigning different units to the units place-holder when displaying the mass value.

The mass, in *slugs*, is $M = 6.85 \cdot \text{slug}$

The mass, in *blobs*, is $M = 0.571 \cdot \text{blob}$

The mass, in *lbm*, is $M = 220.5 \cdot \text{lb}$

Note: Mathcad uses lbf for pound-force, and lb for pound-mass.

2. To determine the weight of the given mass, multiply the mass value by the acceleration due to gravity, g.

The weight, in *lbf*, is $W := M \cdot g \quad W = 220.5 \cdot \text{lbf}$

The weight, in *N*, is $W := M \cdot g \quad W = 980.7 \cdot \text{N}$