mass: amount of matter

- measured in kg or lbm (pound mass)

  1 lbm ≡ 0.4535 kg
  ↳ by definition

force

1 N = 1 kg · 1 m/s²

ex: 100 kg → F = 100 kg · 9.80 m/s² = 9.80·10² N

lbf = 1 lbm · 32.174 ft/s²

standard gravity = 32.174 ft/s²

lbm → lbf

ex: mass = 100 lbm

F = 100 lbm · 32.174 ft/s² = 32.174 · 100 lbm · ft/s²

Force in lbf = $\frac{32.174 \cdot 100 \text{ lbm} \cdot \text{ft/s}^2}{32.174 \text{ ft/s}^2} \cdot \frac{1 \text{ lbf}}{} = 100 \text{ lbf}$

Summary

1 N is force to accelerate 1 kg at 1 m/s².

Given a force (weight) of 100 kg m/s², the conversion to N is multiplication by 1.

1 lbf is force to accelerate 1 lbm to 32.174 ft/s².

Given force (weight) in lbm ft/s², conversion to lbf means multiplic. by 1/32.174.