Unsolved exercise problems from Compressible Fluid Flows (P. H. Oosthuizen, W. E. Carscallen) Solution prepared by **Sourabh Bhat** (mail.spbhat@gmail.com)

1.2) The gravitational acceleration on a large planet is $90\,\mathrm{ft/s}^2$. What is the gravitational force acting on a spacecraft with a mass of 8000 lbm on this planet?

Solution:

Given: $a = 90 \,\text{ft/s}^2$, $m = 8000 \,\text{lbm}$, F = ?

The force acting on the spacecraft is

$$F = m \times a$$

$$F = 8000 \times 90 = 720000 \,\mathrm{lbm-ft/s}^2$$

or

$$F=720000/32.2=22360.25\,\mathrm{lbf}$$