

## Problem 1.30

[Difficulty: 1]

**1.30** The kilogram force is commonly used in Europe as a unit of force. (As in the U.S. customary system, where 1 lbf is the force exerted by a mass of 1 lbm in standard gravity, 1 kgf is the force exerted by a mass of 1 kg in standard gravity.) Moderate pressures, such as those for auto or truck tires, are conveniently expressed in units of  $\text{kgf}/\text{cm}^2$ . Convert 32 psig to these units.

**Given:** Definition of kgf.

**Find:** Conversion from psig to  $\text{kgf}/\text{cm}^2$ .

**Solution:** Use Table G.2.

Define kgf  $\text{kgf} = 1 \cdot \text{kg} \times 9.81 \cdot \frac{\text{m}}{\text{s}^2} \quad \text{kgf} = 9.81 \text{N}$

Then  $32 \cdot \frac{\text{lbf}}{\text{in}^2} \times \frac{4.448 \text{N}}{1 \cdot \text{lbf}} \times \frac{1 \cdot \text{kgf}}{9.81 \cdot \text{N}} \times \left( \frac{12 \cdot \text{in}}{1 \cdot \text{ft}} \times \frac{1 \cdot \text{ft}}{0.3048 \text{m}} \times \frac{1 \cdot \text{m}}{100 \text{cm}} \right)^2 = 2.25 \frac{\text{kgf}}{\text{cm}^2}$