**Physics 103 Quiz # 1, Thursday (1/24/2013)**
Show all work in order to obtain points for problems

**Name:**_____

1. (4 pts) A standard exam page is 8.5 inches by 11 inches. An exam that is 2.0 mm thick has a volume of:
   a. $1.9 \times 10^4$ mm$^3$.
   b. $4.7 \times 10^4$ mm$^3$.
   c. $1.2 \times 10^5$ mm$^3$.
   d. $3.1 \times 10^3$ mm$^3$.
   e. $2.0 \times 10^5$ mm$^3$.

$$\left(8.5 \text{ in} \times 25.4 \text{ mm/in}\right)\left(11 \text{ in} \times 25.4 \text{ mm/in}\right)\left(2.0 \text{ mm}\right)$$

$$= 1.2 \times 10^5 \text{ mm}^3$$

2. (6 pts) A large man sits on a chair (with four legs) with his feet off the floor. The combined mass of the man and the chair is 95.0 kg. The chair has legs which can be considered as rods of radius 0.5 cm. (a) What is the cross sectional area of one leg of the chair (in m$^2$)? (b) What is the force exerted each leg on the floor? (b) What pressure does each leg exert on the floor?

$$F = mg = 95 \text{ kg} \times 9.8 = 931 \text{ N}$$
Total weight

(a) $\quad A = \pi r^2 = \pi \left(0.5 \text{ cm} \times \dfrac{\text{m}}{100 \text{ cm}}\right)^2 = 7.85 \times 10^{-5} \text{ m}^2$

(b) $\quad F_L = F/4 = \dfrac{931}{4} = 233 \text{ N}$

(c) $\quad P = F/A = \dfrac{233 \text{ N}}{7.85 \times 10^{-5} \text{ m}^2}$

$$= 2.97 \times 10^6 \text{ Pa}$$
$$= 2.97 \text{ MPa}$$