

HW 1: #48, 76

48)

(Given) A coining press is used to make commemorative coins with the likenesses of all the U.S. presidents. The coining process requires a force of 18,000 lb. The hydraulic cylinder has a diameter of 2.50 in.

Find) compute required oil pressure.

Solution)

$$P_{oil} = \frac{F}{A}$$

$$F = 18,000 \text{ lb} \quad D = 2.5 \text{ in}$$

$$A = \frac{\pi}{4} (2.5)^2$$

$$A = 4.909 \text{ in}^2$$

$$P_{oil} = \frac{18,000 \text{ lb}}{4.909 \text{ in}^2}$$

$$P_{oil} = 3666.73 \text{ lb/in}^2 \text{ or psi}$$

76)

(Given) In the U.S., hamburger and other meats are sold by the pound. Assuming that this is 1.00 lb force

Find) compute mass in kg, and slug, and the weight in N.

Solution)

$$m = \frac{W}{g} = \frac{1}{32.2}$$

$$m = .031 \text{ lb} \cdot \text{s}^2 / \text{ft}$$

$$\text{or}$$

$$m = .031 \text{ slug}$$

$$1 \text{ lbf} = 4.448 \text{ N}$$

$$W_{meat} = 1 \text{ lbf} \cdot \frac{4.448 \text{ N}}{1 \text{ lbf}}$$

$$W = 4.448 \text{ N}$$

$$m = \frac{4.448}{9.81}$$

$$m = .453 \text{ N} \cdot \text{s}^2 / \text{m}$$

$$m = .453 \text{ kg}$$