Name_____ Date_____

U.06b – Intermediate Hydraulic Practice Problems

$$P = \frac{F_1}{A_1} = \frac{F_2}{A_2}$$

1. A hydraulic press has an input cylinder 1 inch in diameter and an output cylinder 6 inches in diameter. Assuming 100% efficiency, find the force exerted by the output piston when a force of 10 pounds is applied to the input piston.

2. If the input piston is moved through 4 inches, how far is the output piston moved?

3. A hydraulic system is said to have a mechanical advantage of 40. Mechanical advantage (MA) is FR (output) / FE (input). If the input piston, with a 12 inch radius, has a force of 65 pounds pushing downward a distance of 20 inches, find:
    a. the volume of fluid that has been displaced

    b. the upward force on the output piston

    c. the radius of the output piston

    d. the distance the output piston moves

$$P = \frac{F_1}{A_1} = \frac{F_2}{A_2}$$

4. What pressure does a 130 pound woman exert on the floor when she balances on one of her heels? Her heels have an average radius of 0.5 inch.

5. A car has a weight of 2500 pounds and rests on four tires, each having a surface area of contact with the ground of 14 square inches. What is the pressure the ground experiences beneath the tires that is due to the car?

6. The input and output pistons of a hydraulic jack are respectively 1 cm and 4 cm in diameter. A lever with a mechanical advantage of 6 is used to apply force to the input piston. How much mass can the jack lift if a force of 180 N is applied to the lever and efficiency is 80%?