

### Answer on Question #49186-Physics-Mechanics-Kinematics-Dynamics

In the hydraulic pistons shown in the sketch, the small piston has a diameter of 2 cm and the large piston has a diameter of 6 cm. How much more force can the larger piston exert, compared with the force applied to the smaller piston?

I know there is no sketch here but the picture has is shaped just like a U

#### Solution

The pressures in both pistons are equal:

$$p_1 = p_2.$$

But,

$$p_1 = \frac{F_1}{A_1}; p_2 = \frac{F_2}{A_2}.$$

Thus

$$\frac{F_1}{A_1} = \frac{F_2}{A_2} \rightarrow \frac{F_2}{F_1} = \frac{A_2}{A_1} = \frac{\frac{\pi d_2^2}{4}}{\frac{\pi d_1^2}{4}} = \frac{d_2^2}{d_1^2} = \left(\frac{6 \text{ cm}}{2 \text{ cm}}\right)^2 = 9.$$

**Answer: 9.**