Hydraulic Practice Problems (Pascal's Principle) Lisa Peck

- $\Delta \mathbf{P} = \underline{\mathbf{F}}_{\underline{1}} = \underline{\mathbf{F}}_{\underline{2}} \\ \mathbf{A}_{1} \quad \mathbf{A}_{2}$
- 1. The large piston in a hydraulic lift has a radius of 250 cm². What force must be applied to the small piston with a radius of 25 cm² in order to raise a car of mass 1500 kg?

2. A trash compactor pushes down with a force of 500 N on a 3 cm² input piston, causing a force of 30,000 N to crush the trash. What is the area of the output piston that crushes the trash?

3. When the button of a trash compactor is pushed, a force of 350 N pushes down on a 1.3 cm² input piston, creating a force of 22,076 N to crush the trash. What is the area of the piston that crushes the trash?

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

4. Johnny the auto mechanic is raising a 1200 kg car on her hydraulic lift so that she can work underneath. If the area of the input piston is 12 cm², while the output piston has an area of 700 cm², what force must be exerted on the input piston to lift the car?

5. Marc' favorite ride at Busch Gardens is the Flying Umbrella, which is lifted by a hydraulic jack. The operator activates the ride by applying a force of 72N to a 30cm² cylindrical piston, which holds the 20,000N ride off the ground. What is the area of the piston that holds the ride?

6. Mr. Sharlow is raising a 2000kg car on his hydraulic lift. If the area of the input piston is 9cm^2 , while the area of the output piston is 630 cm^2 , what force must be exerted on the input piston to lift the car?