

## AP 2 Fluids WS 3

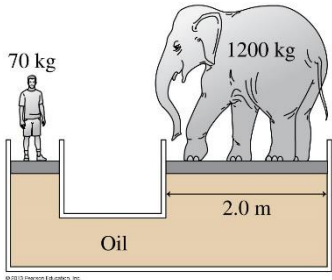
What es your nombre? \_\_\_\_\_



“They are what we thought they were.” Dennis Green, Arizona Cardinals head coach.

1. How far must a 2.0 cm diameter piston be pushed down into one cylinder of a hydraulic lift to raise an 8.0 cm diameter piston by 20 cm?
2. A 6.00 diameter sphere with a mass of 89.3 g is neutrally buoyant in a liquid. Identify the liquid.
3. You and your friends are playing in the swimming pool with a 60 cm diameter beach ball. How much force would be needed to push the ball completely under water?

4. A porthole on a sub has an area of  $0.380 \text{ m}^2$ . It is at a depth of  $9562 \text{ m}$  in the Pacific Ocean. So what is the force acting on the porthole?



5. a. The  $70 \text{ kg}$  student in the figure on the left balances a  $1200 \text{ kg}$  elephant on a hydraulic lift. What is the diameter of the piston the student is standing on?

6. As a person dives toward the bottom of a swimming pool, the pressure increases noticeably. Does the buoyant force also increase? Explain. Neglect any change in water density with depth.

7. (10 points)

A diver descends from a salvage ship to the ocean floor at a depth of  $35 \text{ m}$  below the surface. The density of ocean water is  $1.025 \times 10^3 \text{ kg/m}^3$ .

- (a) Calculate the gauge pressure on the diver on the ocean floor.  
 (b) Calculate the absolute pressure on the diver on the ocean floor.

The diver finds a rectangular aluminum plate having dimensions  $1.0 \text{ m} \times 2.0 \text{ m} \times 0.03 \text{ m}$ . A hoisting cable is lowered from the ship and the diver connects it to the plate. The density of aluminum is  $2.7 \times 10^3 \text{ kg/m}^3$ . Ignore the effects of viscosity.

- (c) Calculate the tension in the cable if it lifts the plate upward at a slow, constant velocity.  
 (d) Will the tension in the hoisting cable increase, decrease, or remain the same if the plate accelerates upward at  $0.05 \text{ m/s}^2$ ?

\_\_\_\_\_ increase      \_\_\_\_\_ decrease      \_\_\_\_\_ remain the same

Explain your reasoning.