**Hydrostatic Equilibrium Worksheet**

**(to follow the astronomy demonstration video at** [**https://www.youtube.com/watch?v=oRpS2Udx55w**](https://www.youtube.com/watch?v=oRpS2Udx55w)**)**

1) The pressure P at various depths h of a fluid in a graduated cylinder is described by where g is the acceleration of gravity. Thus the differential pressure, the amount above atmospheric pressure P0 due to the fluid, is described by . Indicate which labeled curve or line correctly describes how the differential pressure P-P0 increases with depth h for a graduated cylinder filled with …

**B**

**C**

**E**

Remember the equation of a line has the form:

y = mx + b

0

0

Depth h

P-P0

**A**

**D**

\_\_**C**\_\_ pure water on Earth

\_\_\_\_\_ pure saltwater (ρsaltwater= 1.3) on Earth

\_\_\_\_\_ pure water on a planet with lower gravity

\_\_\_\_\_ water/karo syrup gradient on Earth

2) Two tall graduated cylinders are shown below. The cylinder on the left contains pure water ρwater= 1.0 g/cm3. The cylinder on the right is half full of Karo syrup ρkaro= 1.33 g/cm3, water is added, and then the two are partially mixed creating a density gradient from top to bottom.

a) For the cylinder on the left, the pressure is Pα at the depth indicated.

-- Indicate with a labeled arrow (if possible) where the pressure 2Pα?

-- Indicate with a labeled arrow (if possible) where the density ρ is 1.25 g/cm3.

b) For the cylinder on the right, the pressure is PB at the depth indicated.

-- Indicate with a labeled arrow (if possible) where the pressure 2Pβ?

-- Indicate with a labeled arrow (if possible) where the density ρ is 1.25 g/cm3.

Pβ

Pα