

# AP FaSTudy: FLUIDS

## Major Players

$\rho$  = density       $V$  = volume       $A$  = cross-sectional area       $v$  = flow speed  
 $P$  = pressure, absolute pressure       $P_0$  = atmospheric pressure       $P_G$  = gauge pressure  
 $B$  = buoyant force (a new mechanical force, like friction, tension, weight, drag, and normal)

## Density

$$\rho = m/V$$

## Pressure

$P = F/A$  (pressure is force per unit of area)

## Pressure in fluids

$$P = P_0 + P_G$$

## Pressure increase with depth in a fluid

$$P = P_0 + \rho gh$$

## Buoyant force

$$B = mg = \rho Vg$$

Write the statement found in the gray box (in §9.6):

## Equation of Continuity

$$A_1 v_1 = A_2 v_2$$

## Bernoulli's Equation

$$P_1 + (1/2)\rho v_1^2 + \rho g y_1 = P_2 + (1/2)\rho v_2^2 + \rho g y_2$$

Write the statement found in the gray box (in §9.7):

## ***Essentials of College Physics (Serway & Vuille)***

### **Read**

Chapter 9, Sections 3-8

### **Answer**

Chapter 9 Conceptual Questions 1, 2, 7

### **Solve**

Chapter 9 Problems 11-12, 24-25, 28, 30, 32, 36-38, 41-43, 46

### **Answers to even-numbered textbook items (answers to odds are in the book)**

Ch. 9

CQ 2. Same strength for both since force on the dam = area x avg. pressure; pressure depends on depth, so same depth means same pressure.

P 12.  $1.9\text{E}+4$  N

P 24. 0.611 kg

P 28. a. 1017.9 N, 1029.7 N   b. 86.2 N   11.8 N for both

P 32. a.  $8570 \text{ kg/m}^3$    b.  $714 \text{ kg/m}^3$

P 36. 154 in/s

P 38. a. 11 m/s    $2.64\text{E}+4$  Pa

P 42. 17.7 m/s   b. 1.73 mm

P 46. 347 m/s