**CE 3305 Fluid Mechanics**
**Quiz 8**
**Spring 2014**

1. What is the rate of acceleration of an object accelerating at a rate of $1.0g$?

$a = 1g = 9.8 m/s^2$

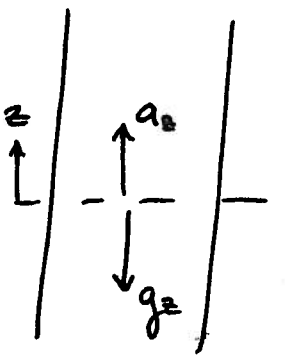
$\therefore 1g = 9.8 m/s^2$

2. What pressure gradient is required to accelerate water vertically upward in a vertical pipe at a rate of $0.5g$.

$\rho \underline{a} = \rho \underline{g} - \nabla p$

$\rho a_z = -\rho g_z - \nabla p$

↑ POINTING DOWNWARD!
REMEMBER EULER'S EQN. IS A FORCE BALANCE




$\rho(a_z + g_z) = -\nabla p$

$-\rho(a_z + g_z) = \nabla p$

$-1000 \frac{kg}{m^3}\left(4.9 m/s^2 + 9.8 m/s^2\right) = \nabla p$ ← $\frac{1}{2}g$

$-14700 N/m^3 = \nabla p$

↑ MEANS PRESSURE GETS SMALLER AS MOVE UP WHICH MAKES SENSE; p HAS TO BE BIGGER AT BOTTOM TO PUSH UP.