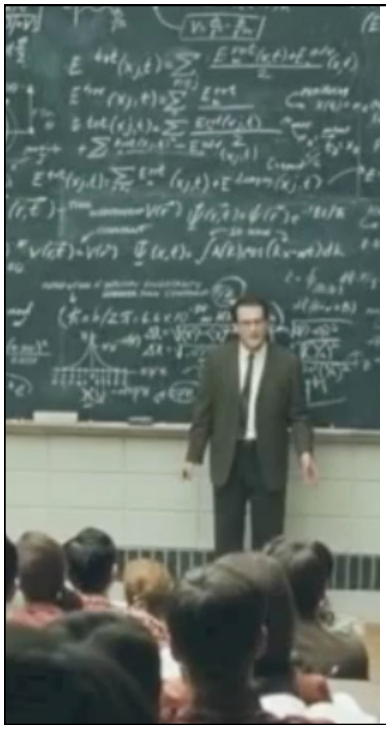
November 7, 2016 Physics 131 Prof. E. F. Redish

- **Theme Music:** Paul Simon
  The Cool, Cool River
- **Cartoon:** Bob Thaves
  Frank & Ernest

11/7/16 Physics 131 **1**



The Equation of the Day

Incompressible flow

$$A_1 v_1 = A_2 v_2$$

The H-P equation

$$\Delta P = = \left(\frac{8\mu L}{\pi R^4} \right) Q$$

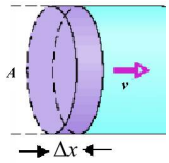
3 **Physics 131**

Foothold ideas: Matter Current (incompressible)

- Q = Current = (volume crossing a surface)/s

$$[Q] = \mathrm{L}^3/\mathrm{T}$$

$$\vec{Q} = \frac{\left(A\Delta\vec{x}\right)}{\Delta t} = \frac{\left(A\vec{v}\Delta t\right)}{\Delta t} = A\vec{v}$$



- Conservation of matter:
  "What goes in must come out."

$$\Delta V_{in} = \Delta V_{out}$$

$$A_1\left(v_1\Delta t\right) = A_2\left(v_2\Delta t\right)$$

$$Q = Av = \text{ constant}$$