

November 7, 2012

Physics 131

Prof. E. F. Redish

## ■ Theme Music:

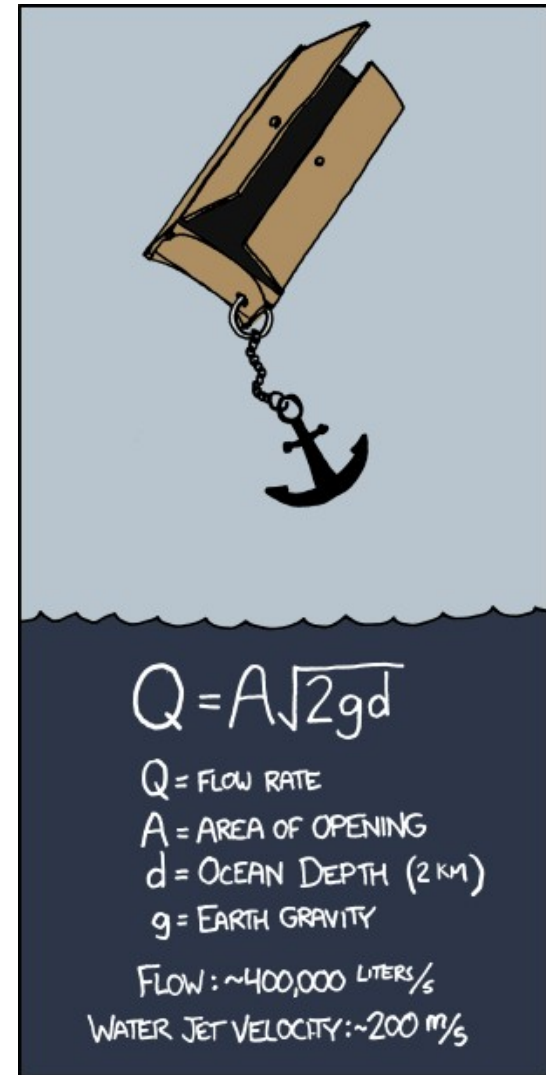
Sade

*Flow*

## ■ Cartoon:

Randall Munroe

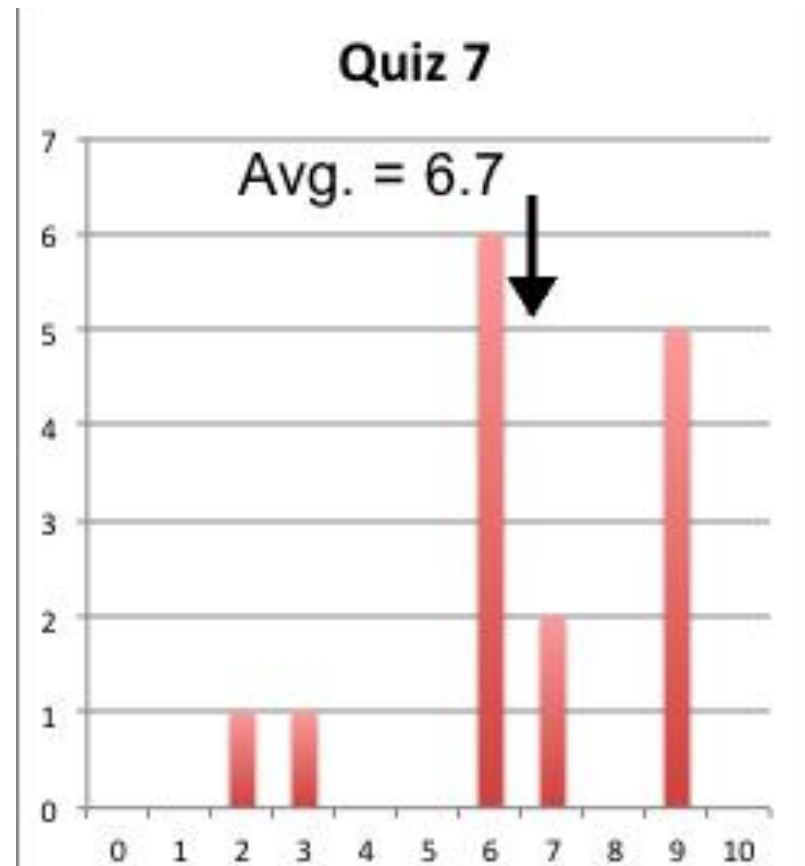
*XKCD*



THE WHITE WITCH DIDN'T  
KNOW WHAT HIT HER.

# Quiz 7

	1	2.1	2.2	3
A	0%	7%	33%	7%
B	7%	93%	100%	80%
C	33%	0%	7%	0%
D	47%	0%	0%	0%
E	7%	0%	0%	13%
N	7%	0%	0%	0%



# Foothold ideas: Surface tension

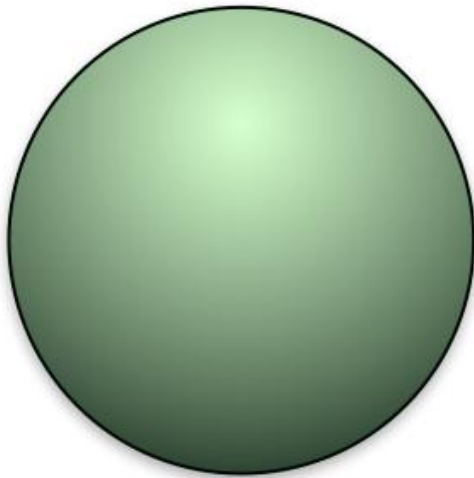


- Due to the intermolecular interactions holding a liquid together, the surface of a liquid experiences a tension.
- The pull across any line in the surface of the liquid is proportional to the length of the line.

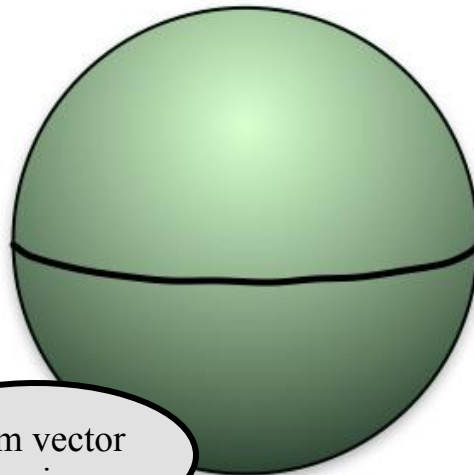
$$F_{\text{surface tension}} = \gamma L$$

# Laplace Bubble Law

Consider a bubble



Now consider  
its top half



From vector  
averaging

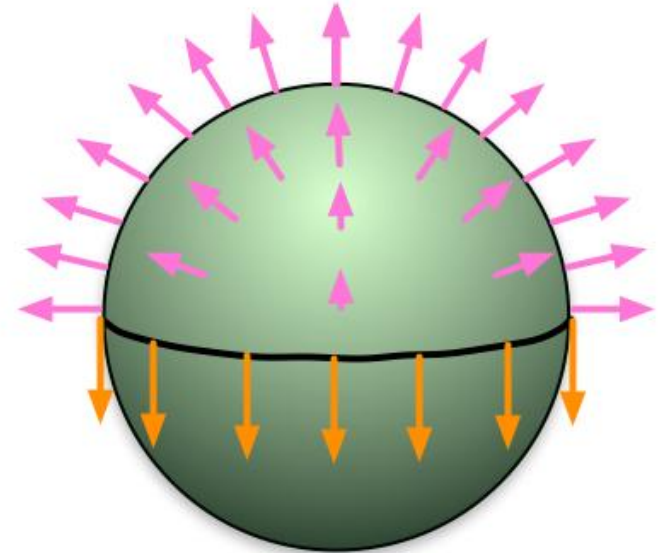
$$F_{\text{air pressure inside} \rightarrow \text{top half}}^{\uparrow} = \frac{1}{2} pA = \frac{1}{2} p(2\pi r^2) = \pi p r^2$$

$$F_{\text{s.t. of bot half} \rightarrow \text{top half}}^{\downarrow} = \gamma L = \gamma(2\pi r) = 2\pi \gamma r$$

$$p = \frac{2\gamma}{r}$$

SMALLER  
bubble has  
bigger pressure!

What forces  
act on it?



Force from pressure  
inside (up) must cancel  
pull of surface tension  
from the bottom half  
(down)