■ **<u>Theme Music:</u>**
Pearl Jam
**   *Even Flow***

■ **<u>Cartoon:</u>**
Randall Munroe
**   *xkcd***

$$Q = A\sqrt{2gd}$$

Q = FLOW RATE
A = AREA OF OPENING
d = OCEAN DEPTH (2 KM)
g = EARTH GRAVITY

FLOW: ~400,000 LITERS/s
WATER JET VELOCITY: ~200 m/s
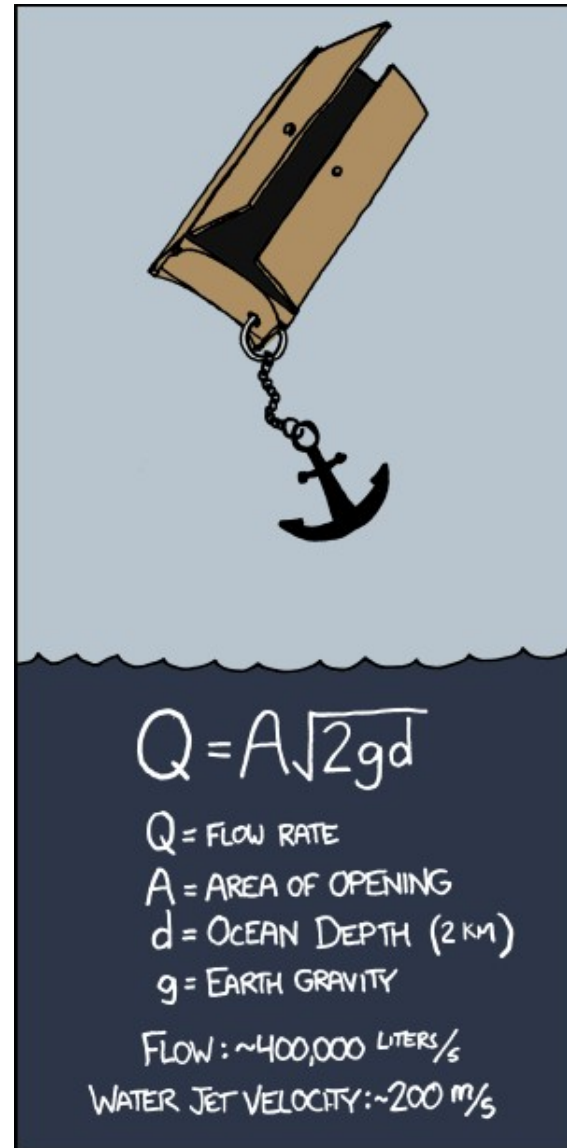
THE WHITE WITCH DIDN'T
KNOW WHAT HIT HER.

Incompressible
flow

$$A_1 v_1 = A_2 v_2$$

3

Physics 131
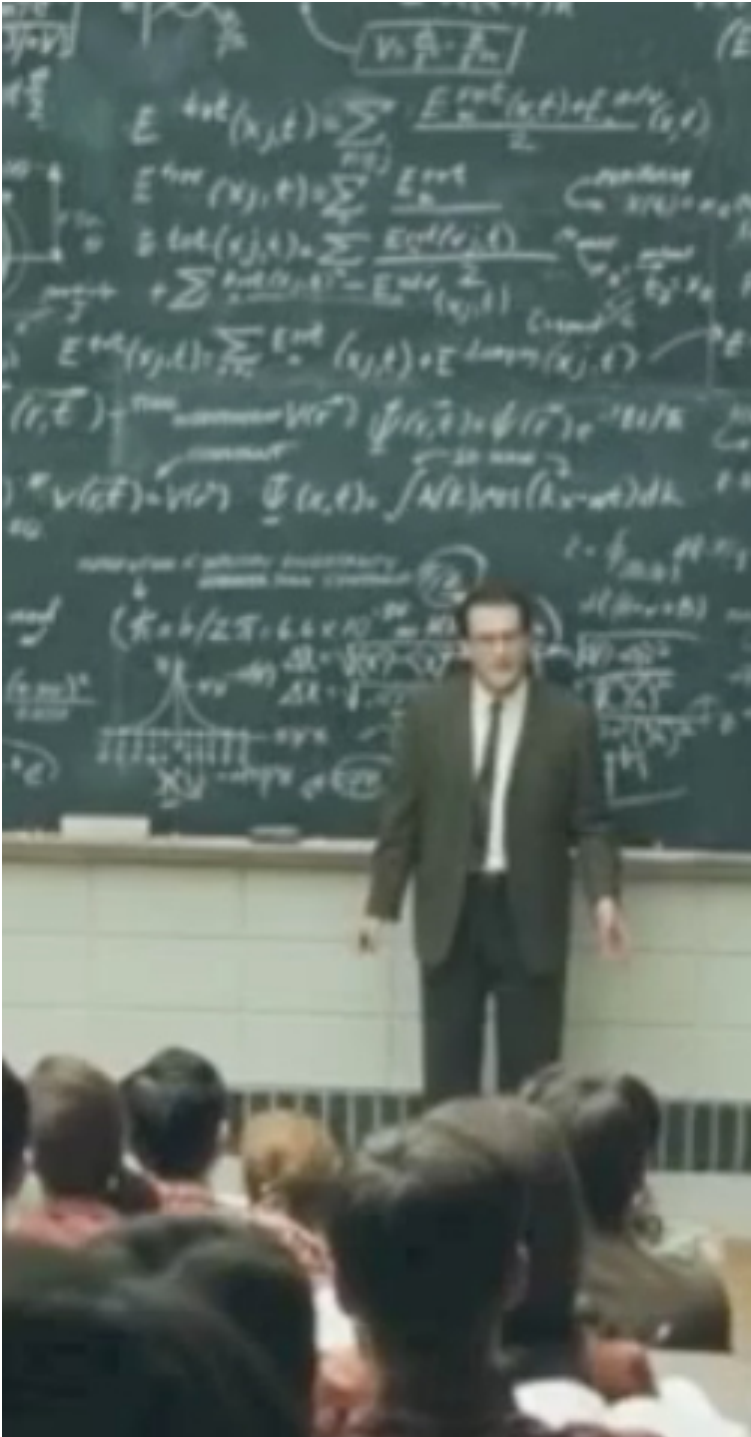
Foothold ideas: Buoyancy

- ***Archimedes' principle***:
  When an object is immersed in a fluid (in gravity), the result of the fluid's pressure variation with depth is an upward force on the object equal to the weight of the water that would have been there if the object were not.

- As a result, an object less dense than the fluid will float, one denser than the fluid will sink.

- An object less dense than the fluid floats with a fraction of its volume under the fluid equal to $\dfrac{\rho_{object}}{\rho_{fluid}}$