Archimedes
(287 BC - 211 BC)

\[ \pi = 3.1415926... \]

EUREKA!

http://www.mcs.drexel.edu/~crorres/Archimedes/Claw/illustrations.html
Hiero: "Is it really 100% gold?"

\[(V_{\text{crown}} \rho_w) g \quad (V_{\text{gold}} \rho_w) g\]

1. raft 2. 3.

**Archimedes**
(287 BC - 211 BC)

*Give me a lever long enough and a place to stand, and I will move the world* 

Is it really possible??

\[F_{\text{Earth}} = 6 \times 10^{25} \text{ N} \quad (M_{\text{Earth}} = 6 \times 10^{24} \text{ kg})\]

\[F_{\text{Arch}} = 600 \text{ N} \quad (60 \text{ kg})\]

\[\frac{L_{\text{Arch}}}{L_{\text{Earth}}} = 1 \times 10^{23} \quad \Rightarrow \quad \frac{D_{\text{Arch}}}{D_{\text{Earth}}} = 1 \times 10^{23}\]

\[D_{\text{Arch}} = 10^{21} \text{ m} \quad \text{With the power of } P=600\text{N} \cdot \text{m/s} \quad t = 10^{21} \text{ s} \approx 5 \times 10^{14} \text{ years} \quad \text{(people do not live that long)}\]

If Archimedes moves his arm with the speed of light, then

\[D_{\text{Arch}} = 50 \text{ m} \quad \text{during } 5 \times 10^9 \text{ years} \quad \text{(life time of the Earth)}\]
Perpetual Motion and "Free Energy"

Perpetuum Mobile
"Machine, which works itself forever"

English: Perpetual Motion

Example 1

Balance of Forces:
\[ \vec{F}_{\text{net}} = \frac{d\vec{P}}{dt} = 0 \]

Balance of Torques:
\[ \tau_{\text{net}} = \frac{d\vec{L}}{dt} = 0 \]

More Examples:

All parts of the cylinder that fall in the greater gravity (magnetic) level must be pushed out, as well. All the work, that a part of cylinder gets when it’s moving toward the greater gravity (magnetic) level is needed when it is pushed back out of it...
Put an inner tube on a wheel. Fill it two thirds with water. Now make another one like it. Now hold the axles and push the wheel up against each other so that they can squeeze each other to the outside. The results are that one side of each wheel is lighter than its other side. That is why the wheel spins.
More Examples:

Buoyancy Motor

buoyant force of Archimedes' principle: "A body immersed in liquid experiences and upward buoyant force equal to the weight of the displaced liquid."

QZ: We are not using this type of vehicle because

a) perpetual motion is forbidden by the Newton’s Laws
b) police does not allow it
c) sitting next to a strong magnet is not good for the driver’s health
d) there are no such strong magnets so far
e) this vehicle is not going to start moving by itself, so it is not very practical for plane roads. Can be only used to go down the hill.