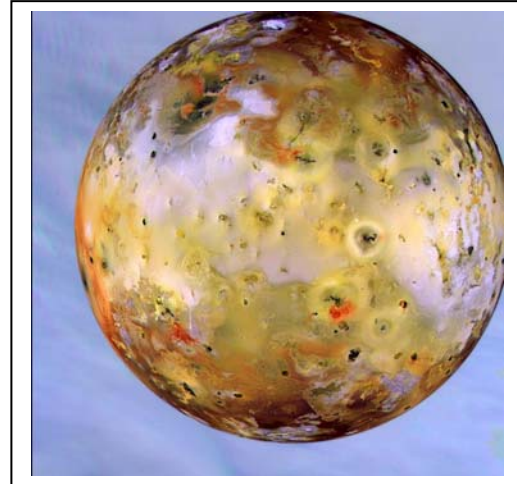


# The Moons of Jupiter – Relative sizes

1



Jupiter has 66 moons. The photographs show two of Jupiter's larger moons: Callisto (left) and Io (right). These moons are all mostly made of ice, even though many of them are thousands of kilometers in diameter. Ice is much more common than rock in the outer solar system, so most of the large bodies in the distant solar system beyond Jupiter are made from ice.

**Problem 1** - The moon Europa is  $\frac{3}{5}$  the diameter of Ganymede, and Io is  $\frac{6}{5}$  the diameter of Europa. How big is Io compared to Ganymede?

**Problem 2** - Callisto is  $\frac{4}{3}$  the diameter of Io, and Io is  $\frac{6}{5}$  the diameter of Europa. How big is Callisto compared to Europa?

**Problem 3** – Himalia is  $\frac{2}{45}$  the diameter of Io, and Io is  $\frac{3}{4}$  the diameter of Callisto. How large is Himalia compared to Callisto?

# Answer Key

1

**Problem 1** - The moon Europa is  $\frac{3}{5}$  the diameter of Ganymede, and Io is  $\frac{6}{5}$  the diameter of Europa. How big is Io compared to Ganymede?

Answer: Europa/Ganymede =  $\frac{3}{5}$  Io/Europa =  $\frac{6}{5}$

so

$$\begin{aligned} \text{Io/Ganymede} &= \text{Europa/Ganymede} \times \text{Io/Europa} \\ &= \frac{3}{5} \times \frac{6}{5} \\ &= \mathbf{\frac{18}{25}} \end{aligned}$$

**Io is  $\frac{18}{25}$  of the diameter of Callisto.**

**Problem 2** - Callisto is  $\frac{4}{3}$  the diameter of Io, and Io is  $\frac{6}{5}$  the diameter of Europa. How big is Callisto compared to Europa?

Answer: Callisto/Io =  $\frac{4}{3}$  Io/Europa =  $\frac{6}{5}$

So Callisto/Europa =  $\frac{4}{3} \times \frac{6}{5} = \frac{24}{15} = \mathbf{\frac{8}{3}}$

**Callisto is  $\frac{8}{3}$  the diameter of Europa**

**Problem 3** – Himalia is  $\frac{2}{45}$  the diameter of Io, and Io is  $\frac{3}{4}$  the size of Callisto. How large is Himalia compared to Callisto?

Answer: Himalia/Io =  $\frac{2}{45}$  Io/Callisto =  $\frac{3}{4}$

$$\begin{aligned} \text{So Himalia/Callisto} &= \frac{2}{45} \times \frac{3}{4} \\ &= \frac{(2 \times 3)}{(4 \times 45)} \\ &= \mathbf{\frac{1}{30}} \end{aligned}$$

**Himalia is  $\frac{1}{30}$  the diameter of Callisto**