



This diagram shows the Top-26 moons and small planets in our solar system, and drawn to the same scale.

Problem 1 – What fraction of the objects are smaller than our moon?

Problem 2 – What fraction of the objects are larger than our moon but are not planets?

Problem 3 – What fraction of the objects, including the moon, are about the same size as our moon?

Problem 4 – If Saturn’s moon Titan is $\frac{1}{2}$ the diameter of Earth, and Saturn’s moon Dione is $\frac{1}{6}$ the diameter of Titan, how large is Dione compared to Earth?

Problem 5 – Oberon is $\frac{1}{7}$ the diameter of Earth, Io is $\frac{1}{3}$ the diameter of Earth, and Titania is $\frac{4}{9}$ the diameter of Io. Which moon is bigger: Oberon or Titania?

Problem 1 – What fraction of the objects are smaller than our moon?

Answer: **17/26**

Problem 2 – What fraction of the objects are larger than our moon but are not planets?

Answer: Io, Callisto, Titan and Ganymede : 4/26 or **2/13**

Problem 3 – What fraction of the objects, including the moon, are about the same size as our moon?

Answer: Moon, Europa, Triton and Pluto so $4/26 = \mathbf{2/13}$.

Problem 4 – Saturn's moon Titan is $\frac{1}{2}$ the diameter of Earth, and Saturn's moon Dione is $\frac{1}{6}$ the diameter of Titan, how large is Dione compared to Earth?

Answer: $\frac{1}{2} \times \frac{1}{6} = \mathbf{1/12}$ the size of Earth.

Problem 5 – Oberon is $\frac{1}{7}$ the diameter of Earth, Io is $\frac{1}{3}$ the diameter of Earth, and Titania is $\frac{4}{9}$ the diameter of Io. Which moon is bigger: Oberon or Titania?

Answer: Oberon is $\frac{1}{7}$ the diameter of Earth.

Titania is $\frac{4}{9}$ the diameter of Io, and Io is $\frac{1}{3}$ the diameter of Earth

So Titania is $(\frac{4}{9}) \times (\frac{1}{3})$ the diameter of Earth

So Titania is $\frac{4}{27}$ the diameter of Earth.

Comparing Oberon, which is $\frac{1}{7}$ the diameter of Earth with Titania, which is $\frac{4}{27}$ the diameter of Earth, which fraction is larger: $\frac{1}{7}$ or $\frac{4}{27}$?

Find the common denominator $7 \times 27 = 189$, then cross-multiply the fractions:

Oberon: $\frac{1}{7} = \frac{27}{189}$ and Titania: $\frac{4}{27} = \frac{(4 \times 7)}{189} = \frac{28}{189}$ so

Titania is $\frac{28}{189}$ Earth's diameter and Oberon is $\frac{27}{189}$ Earth's diameter, and so **Titania is slightly larger!**