



Some of the planets in our solar system are much bigger than Earth while others are smaller. By using simple fractions, you will explore how their sizes compare to each other.

Image courtesy NASA/Chandra Observatory/SAO

Problem 1 - Saturn is 10 times bigger than Venus, and Venus is $\frac{1}{4}$ the size of Neptune. How much larger is Saturn than Neptune?

Problem 2 - Earth is twice as big as Mars, but only $\frac{1}{11}$ the size of Jupiter. How large is Jupiter compared to Mars?

Problem 3 - Earth is the same size as Venus. How large is Jupiter compared to Saturn?

Problem 4 - Mercury is $\frac{3}{4}$ the size of Mars. How large is Earth compared to Mercury?

Problem 5 - Uranus is the same size as Neptune. How large is Uranus compared to Earth?

Problem 6 - The satellite of Saturn, called Titan, is $\frac{1}{10}$ the size of Uranus. How large is Titan compared to Earth?

Problem 7 - The satellite of Jupiter, called Ganymede, is $\frac{2}{5}$ the size of Earth. How large is it compared to Jupiter?

Problem 8 - The Dwarf Planet Pluto is $\frac{1}{3}$ the diameter of Mars. How large is the diameter of Jupiter compared to Pluto?

Problem 9 - If the diameter of Earth is 13,000 km, what are the diameters of all the other bodies?

Answer Key

Note to teachers: The actual diameters of the planets, in kilometers, are as follows

Mercury	4,900 km	Jupiter	143,000 km
Venus	12,000 km	Saturn	120,000 km
Earth	13,000 km	Uranus	51,000 km
Mars	6,800 km	Neptune	50,000 km

Also: Titan = 5,100 km, Ganymede = 5,300 km Ceres = 950 km, and Pluto 2,300 km

Advanced students (Grades 4 and above) may use actual planetary size ratios as decimal numbers, but for this simplified version (Grades 2 and 3), we approximate the size ratios to the nearest simple fractions. **Students may also use the information in these problems to make a scale model of the solar system in terms of the relative planetary sizes.**

Problem 1 - Saturn is 10 times bigger than Venus, and Venus is $\frac{1}{4}$ the size of Neptune. How much larger is Saturn than Neptune?

Answer: Neptune is 4x Venus and Saturn is 10x Venus, so Saturn is $\frac{10}{4} = \frac{5}{2}$ times as big as Neptune.

Problem 2 - Earth is twice as big as Mars, but only $\frac{1}{11}$ the size of Jupiter. How large is Jupiter compared to Mars?

Answer: Jupiter is 11 x Earth, and Mars is $\frac{1}{2}$ Earth, so Jupiter is 22x Mars.

Problem 3 - Earth is the same size as Venus. How large is Jupiter compared to Saturn?

Answer: If Saturn is 10 x Venus, and Jupiter is 11 x Earth, Jupiter is $\frac{11}{10}$ times Saturn.

Problem 4 - Mercury is $\frac{3}{4}$ the size of Mars. How large is Earth compared to Mercury?

Answer: Mars is $\frac{1}{2}$ x Earth, so Mercury is $\frac{3}{4} \times \frac{1}{2} = \frac{3}{8}$ x Earth

Problem 5 - Uranus is the same size as Neptune. How large is Uranus compared to Earth?

Answer: Neptune was 4x Venus, but since Venus = earth and Neptune=Uranus, we have Uranus = 4x Earth.

Problem 6 - The satellite of Saturn, called Titan, is $\frac{1}{10}$ the size of Uranus. How large is Titan compared to Earth?

Answer: Titan / Uranus = $\frac{1}{10}$, but Uranus/Earth = 4, so Titan/Earth = $\frac{3}{10} \times 4 = \frac{2}{5}$.

Problem 7 - The satellite of Jupiter, called Ganymede, is $\frac{2}{5}$ the size of Earth. How large is it compared to Jupiter?

Answer: Earth = $\frac{1}{11}$ Jupiter so Ganymede is $\frac{1}{11} \times \frac{2}{5} = \frac{2}{55}$ x Jupiter.

Problem 8 - The Dwarf Planet Pluto is $\frac{1}{3}$ the size of Mars. How large is Jupiter compared to Pluto?

Answer: Jupiter = $\frac{1}{11}$ Earth, Mars= $\frac{1}{2}$ Earth, so Pluto= $\frac{1}{3} \times \frac{1}{2} = \frac{1}{6}$ Earth, and $\frac{1}{66}$ Jupiter.

Problem 9 – **Answer: Students should, very nearly, reproduce the numbers in the table at the top of the page.**