**Lower Elementary:**

*Question:* The Moon is 3,500 kilometers wide. The Earth is 12,700 kilometers wide. How many kilometers wider is the Earth than the Moon?

**Upper Elementary:**

*Question:* For every 2 revolutions Pluto makes around the Sun, Neptune makes 3. How many revolutions does Pluto complete if Neptune completes 21?



**Middle School:**

*Question:* Callisto, Europa, Ganymede, and Io are moons of Jupiter. Ganymede is not the farthest moon from Jupiter. Callisto’s orbit is not the closest orbit to Io’s. Europa is closer to Jupiter than Ganymede is. Io is the closest to Jupiter. What is Jupiter’s farthest moon?

**Algebra and Up:**

*Question:* Mars has a radius of 3,000 kilometers. Venus has a radius of 6,000 kilometers. How many cubic kilometers greater is the volume of Venus than the volume of Mars? Give your answer in terms of pi.

**Lower Elementary:**

*Question:* The Moon is 3,500 kilometers wide. The Earth is 12,700 kilometers wide. How many kilometers wider is the Earth than the Moon?

*Answer:* 9,200 kilometers

*Solution:* To solve the problem, we want to set up a vertical equation, start at the ones place, and move left. We know that 0 – 0 = 0, so we can fill in the ones and tens places and move on to the hundreds. 7 hundred minus 5 hundred is 2 hundred, and 12 thousand minus 3 thousand is 9 thousand. Altogether, that makes 9,200 km.

**Upper Elementary:**

*Question:* For every 2 revolutions Pluto makes around the Sun, Neptune makes 3. How many revolutions does Pluto complete if Neptune completes 21?

*Answer:* 14 revolutions

*Solution:* The ratio of Pluto’s revolutions to Neptune’s revolutions is 2:3. To find out how many revolutions Pluto completes, we first need to find out how many times Neptune makes 3 trips. 21 ÷ 3 = 7, so Neptune make 7 sets of 3 revolutions. That means that Pluto makes 7 sets of 2 revolutions, which means that Pluto revolves around the sun 7 × 2 = 14 times.



**Middle School:**

*Question:* Callisto, Europa, Ganymede, and Io are moons of Jupiter. Ganymede is not the farthest moon from Jupiter. Callisto’s orbit is not the closest orbit to Io’s. Europa is closer to Jupiter than Ganymede is. Io is the closest to Jupiter. What is Jupiter’s farthest moon?

*Answer:* Callisto

*Solution:* Right off the bat, we know that Io is the closest and Ganymede is not the farthest. Next, we can deduce that Europa is the second closest because that’s the only possible way for it to be closer to Jupiter than Ganymede, which must therefore be third. That leaves Callisto, which must therefore be the farthest. Tip: Use a logic table to keep track of the information.

**Algebra and Up:**

*Question:* Mars has a radius of 3,000 kilometers. Venus has a radius of 6,000 kilometers. How many cubic kilometers greater is the volume of Venus than the volume of Mars? Give your answer in terms of pi.

*Answer:* 252,000,000,000 π km3 or 2.52 × 1011 π km3

*Solution:* We use the formula 4/3πr3 to find the volume of each planet. Venus’s volume is 288,000,000,000π km3, and Mars’s volume is 36,000,000,000π km3. The difference is therefore 252,000,000,000π km3.