



**Exercise 4**

Compute how many times heavier a proton is than an electron (that is, find the value of the ratio). Round your final answer to the nearest one.

$$\frac{1.672622 \times 10^{-27}}{9.10938291 \times 10^{-31}} = \frac{1.672622}{9.10938291} \times \frac{10^{-27}}{10^{-31}}$$

$$= 0.183615292 \times 10^4$$

$$= 1.83615292 \times 10^3$$

$$= 1836.15292$$

$$\approx 1836$$

A proton is about 1836 times larger than an electron.

**Example 2**

The U.S. national debt as of March 23, 2013, rounded to the nearest dollar, is \$16,755,133,009,522. According to the 2012 U.S. census, there are about 313,914,040 U.S. citizens. What is each citizen's approximate share of the debt?

$$\frac{1.6755 \times 10^{13}}{3.14 \times 10^8} = \frac{1.6755}{3.14} \times \frac{10^{13}}{10^8}$$

$$= \frac{1.6755}{3.14} \times 10^5$$

$$= 0.533598... \times 10^5$$

$$\approx 0.5336 \times 10^5$$

$$= 53360$$

Each U.S. citizen's share of the national debt is about \$53,360.