Lesson 8: Estimating Quantities

Classwork

Exercise 1

The Federal Reserve states that the average household in January of $2013$ had $\$7,122 $in credit card debt. About how many times greater is the U.S. national debt, which is $\$16,755,133,009,522$? Rewrite each number to the nearest power of $10$ that exceeds it, and then compare.

Exercise 2

There are about $3,000,000 $students attending school, kindergarten through $12$th grade, in New York. Express the number of students as a single-digit integer times a power of $10$.

The average number of students attending a middle school in New York is $8×10^{2}$. How many times greater is the overall number of K-12 students compared to the number of middle school students?

Exercise 3

A conservative estimate of the number of stars in the universe is $6×10^{22}$. The average human can see about $3,000 $stars at night with his naked eye. About how many times more stars are there in the universe, compared to the stars a human can actually see?

Exercise 4

The estimated world population in $2011$ was $7×10^{9}$. Of the total population, $682$ million of those people were left-handed. Approximately what percentage of the world population is left-handed according to the $2011$ estimation?

Exercise 5

The average person takes about $30,000$ breaths per day. Express this number as a single-digit integer times a power of $10$.

If the average American lives about $80$ years (or about $30,000$ days), how many total breaths will a person take in her lifetime?

Problem Set

1. The Atlantic Ocean region contains approximately $2×10^{16}$ gallons of water. Lake Ontario has approximately $8,000,000,000 $gallons of water. How many Lake Ontarios would it take to fill the Atlantic Ocean region in terms of gallons of water?
2. U.S. national forests cover approximately $300,000$ square miles. Conservationists want the total square footage of forests to be $300,000^{2}$ square miles. When Ivanna used her phone to do the calculation, her screen showed the following:
	1.  What does the answer on her screen mean? Explain how you know.
	2. Given that the U.S. has approximately $4$ million square miles of land, is this a
	 reasonable goal for conservationists? Explain. .
3. The average American is responsible for about $20,000$ kilograms of carbon emission pollution each year. Express this number as a single-digit integer times a power of $10$.
4. The United Kingdom is responsible for about $1×10^{4}$ kilograms. Which country is responsible for greater carbon emission pollution each year? By how much?