Unit 1 Lesson 8 – Using Powers of Ten to Estimate Quantities

1.) What is the smallest power of 10 that would exceed ?

2.) What is the smallest power of 10 that would exceed ?

3.) Which number is equivalent to : or ?

4.) The chance of winning a big lottery prize is about , and the chance of being struck by lightning in the US in any given year is about 0.000001. Which do you have a greater chance of experiencing? Explain.

5.) Place the following numbers in order from least to greatest.

6.) There are about 3,000,000 students attending school, kindergarten through Grade 12, in New York. Express the number of students as a single-digit integer times a power of ten.

7.) The estimated world population in 2011 was 7,000,000,000. What is this number as a single-digit integer times a power of ten?

8.) A conservative estimate of the number of stars in the universe is 60,000,000,000,000,000,000,000. How many stars are there in the universe written as a single-digit integer times a power of ten?

9.) The U.S. national debt was $16,755,133,009,522 in 2013. Rewrite the number as single-digit times a power of ten.

10.) Express 0.000000298 as a single digit times a power of ten.

11.) Mt. Everest is 29,035 feet tall. Use a single digit times a power of 10 to estimate the height of Mt. Everest to the nearest ten thousand feet.

12.) A scientist records the mass of a proton as 0.0000000000000000000000016726231 gram. Use a single digit times a power of 10 to estimate the mass.

13.) The dimeter of one species of bacteria is 0.00000025691. Bonnie approximates the measure as 3 x 10-11. Is she correct? Explain.

14.) Keegan and Jeff did some research and found that here are approximately 7,492,000,000,000,000,000 grains of sand on Earth. Jeff says that it is about 7 x 1015 grains of sand. Keegan says that this is about 7 x 1018 grains of sand. Whose estimate, Jeff’s or Keegan’s, is more logical? Explain.

15.) How does the Gross Domestic Product (GDP) of Canada compare to that of the United States?

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| Canada | $1,785,387,000,000,000 |
| USA | $17,348,075,000,000,000 |

16.) Mathaias used a laser to measure the average thickness of a human hair, which is 0.00017763 meters. A sheet of paper is about 0.001 meters thick. How do the two thicknesses compare?