ALBERT

Name _____ Date _____

Estimating with Powers of 10 Worksheet

Grade 8 · Common Core 8.EE.A.3

> Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. For example, estimate the population of the United States as 3×10^8 and the population of the world as 7×10^9, and determine that the world population is more than 20 times larger.

Practice

Builds the skill step by step.

1. Write 300,000 as a single digit times a power of 10.

2. Write 0.004 as a single digit times a power of 10.

3. Write 7×10^4 in standard form.

4. Write 5×10^{-2} in standard form.

5. Estimate 48,000 as a single digit times a power of 10.

6. Which is greater, 3×10^6 or 9×10^5?

   A. 3×10^6

   B. 9×10^5

   C. They are equal

   D. You cannot tell

7. How many times as much is 10^7 as 10^4?

8. Estimate 0.00071 as a single digit times a power of 10.

9. Which is the best estimate of 6,200,000?

   A. 6×10^7

   B. 6×10^6

   C. 6×10^5

   D. 62×10^6

10. How many times as much is 8×10^5 as 2×10^5?

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On Level

Grade-level practice.

1. A city has about 2×10^6 people. A town has about 4×10^4 people. About how many times as many people live in the city?

2. A bee has a mass of about 1×10^{-4} kilogram. A small bird has a mass of about 5×10^{-2} kilogram. About how many times as heavy is the bird?

3. Estimate 0.0000389 as a single digit times a power of 10.

4. Estimate 912,000,000 as a single digit times a power of 10.

5. Which number is the smallest?

   A. 5×10^{-5}

   B. 3×10^{-4}

   C. 2×10^{-3}

   D. 9×10^{-4}

6. A country has about 3×10^8 people. The world has about 8×10^9 people. About how many times as many people live in the world? Round to the nearest whole number.

7. A hard drive holds about 2×10^{12} bytes. One photo uses about 4×10^{6} bytes. About how many photos fit? Write your answer as a single digit times a power of 10.

8. How many times as much is 6×10^{8} as 3×10^{5}?

9. A grain of sand is about 5×10^{-4} meter wide. Which is the same length in standard form?

   A. 0.005 meter

   B. 0.00005 meter

   C. 0.0005 meter

   D. 5,000 meters

10. Estimate 0.0019 as a single digit times a power of 10.

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Challenge

Multi-step and word problems that stretch it.

1. A virus is about 1×10^{-7} meter long. A cell is about 2×10^{-5} meter long. About how many times as long is the cell?

2. One number is about 4×10^{9}. Another is about 8×10^{7}. About how many times as large is the first number?

3. Jin says 4×10^{6} is twice as much as 2×10^{3} because 4 is twice 2. How many times as much is it really?

   A. 2,000

   B. 2

   C. 3

   D. 2,000,000

4. Estimate 0.0000000052 as a single digit times a power of 10.

5. A city has about 7×10^{5} people. Its stadium holds about 7×10^{4} people. About how many full stadiums would the whole city fill?

6. A heart beats about 1×10^5 times a day. Estimate how many times it beats in a 365-day year. Write your answer as a single digit times a power of 10.

7. Order from least to greatest: 6×10^{-3}, 6×10^{-2}, 9×10^{-4}

8. 3×10^n is 1,000 times as much as 3×10^4. Find n.

9. A bacterium is about 2×10^{-6} meter long. About how many would fit end to end across 1 centimeter (1×10^{-2} meter)?

10. Which statement is true?

    A. 2×10^{-3} is greater than 1×10^{-2}.

    B. 9×10^5 is greater than 1×10^6.

    C. 5×10^4 equals 50×10^5.

    D. 9×10^5 is less than 1×10^6.