Unit Conversions

Worksheet 1

Scientific Notation

1. Write the following numbers in standard notation.

   a. 4.56×10^{3}

   b. 7.8×10^{-2}

   c. 9.01×10^{6}

   d. 3.12×10^{-4}

2. Write the following numbers in scientific notation.

   a. 400

   b. 0.802

   c. 9012

   d. 7.2

3. Write the following measurements in scientific notation.

a. 5682 kg

b. 6007 m

c. 0.00092 g

d. 5.67 m^2

4. Write the following measurements in standard notation.

a. 5.67×10^5 m/s

b. 1.4×10^{-3} kg

c. 8.21×10^2 m

d. 7.21×10^{-5} g

5. Perform the following calculations.

   a. $5.6 \times 10^2 - 56 =$

   b. $1.2 \times 10^{-2} + 0.2 =$

6. Would standard notation or scientific notation be more appropriate to represent the size of an atom in meters (m)?

7. Which of the following is most likely the distance between the earth and the sun?

   a. 1.5×10^{-10} km b. 1.5×10^2 km c. 1.5×10^8 km

Answer Key

1. Write the following numbers in standard notation.

   a. 4.56×10^3

   When the power of 10 is positive, move the decimal to the *right* a number of times equal to the value of the exponent. In problem 1a, you would move the decimal **three** places **right** since the power of 10 is a positive three:

   

   Thus, the answer is 4560.

   Correct answer: 4560

   b. 7.8×10^{-2}

   When the power of 10 is negative, you move the decimal place *left* the number of times equal to the value of the exponent. In problem 1b, you would move the decimal **two** places **left** since the power of 10 is negative two:

   

   Thus, the answer is 0.078.

   Correct answer: 0.078

   c. 9.01×10^6

   9,010,000

   d. 3.12×10^{-4}

   0.000312

2. Write the following numbers in scientific notation.

a. 400

When converting a number greater than 1 to scientific notation, move the decimal to the immediate right of the leftmost digit. For example, in problem 2a, move the decimal to the right of 4:

The number of times the decimal place was moved becomes the power of 10.

So, 400 becomes 4.00×10^2 since the decimal place was moved **two places** to the **left**.

Correct answer: 4.00×10^2

b. 0.802

When converting a number less than zero to scientific notation, move the decimal place to the immediate right of the leftmost non-zero digit. For example, in problem 2b, move the decimal place to the right of the 8.

Since the decimal place was moved **one** place to the **right**, the power of 10 is -1.

Correct answer: 8.02×10^{-1}

c. 9012

Correct answer: 9.012×10^3

d. 7.2

Any number raised to the power of 0 equal 1. Thus, 7.2 becomes 7.2×10^0.

Correct answer: 7.2×10^0

3. Write the following measurements in scientific notation.

a. 5682 kg

5.682×10^3 kg

b. 6007 m

6.007×10^3 m

c. 0.00092 g

9.2×10^{-4} g

d. 5.67 m^2

5.67×10^0 m^2

4. Write the following measurements in standard notation.

a. 5.67×10^5 m/s

567,000 m/s

b. 1.4×10^{-3} kg

0.0014 kg

c. 8.21×10^2 m

821 m

d. 7.21×10^{-5} g

0.0000721 g

5. Perform the following calculations.

a. $5.6 \times 10^2 - 56 =$

$5.6 \times 10^2 = 560$

$560 - 56 = 504$

Correct answer: 504

b. $1.2 \times 10^{-2} + 0.2 =$

$1.2 \times 10^{-2} = 0.012$

$0.012 + 0.2 = 0.212$

Correct answer: 0.212

6. Would standard notation or scientific notation be more appropriate to represent the size of an atom in meters (m)?

Since the size of an atom is very small, it would be best to represent in scientific notation when using meters. For reference, the size is roughly 10^{-15} m. If written in standard notation, this would be 0.00000000000001. Writing so many zeroes is tedious, so scientific notation is used.

Correct answer: scientific notation

7. Which of the following is most likely the distance between the earth and the sun?

a. 1.5×10^{-10} km b. 1.5×10^2 km c. 1.5×10^8 km

Intuitively, you know that the distance between the earth and the sun is quite a large distance. Option a is a very small distance since the power of 10 is negative, while option b is only 150 km (less than 100 miles). Therefore, option c is most likely correct since it represents an incredibly large number.

Correct answer: c. 1.5×10^8 km