Name _____ Date _____ Class _____

MATH HANDBOOK TRANSPARENCY WORKSHEET 1

Scientific Notation

Use with Appendix B, Scientific Notation

1. Express each of the following numbers in scientific notation.

a. 230

2.3×10^{2}

b. 5601

5.601×10^{3}

c. 14 100 000

1.41×10^{7}

d. 56 million

$56\,000\,000 = 5.6 \times 10^{7}$

e. 2/10

$0.2 = 2 \times 10^{-1}$

f. 0.450 13

4.5013×10^{-1}

g. 0.089

8.9×10^{-2}

h. 0.000 26

2.6×10^{-4}

i. 0.000 000 698

6.98×10^{-7}

j. 12 thousandth

$0.0012 = 1.2 \times 10^{-3}$

2. Express each of the following measurements in scientific notation.

a. speed of light in a vacuum, 299 792 458 m/s

$\sim 3.00 \times 10^{8}$ m/s

b. number of seconds in a day, 86 400 s

8.64×10^{4} s

c. mean radius of Earth, 6378 km

6.378×10^{3} km

d. density of oxygen gas at 0°C and pressure of 101 kPa, 0.001 42 g/mL

1.42×10^{-3} g/mL

e. radius of an argon atom, 0.000 000 000 098 m

9.8×10^{-10} m

SCIENTIFIC NOTATION

Name _____

Scientists very often deal with very small and very large numbers, which can lead to a lot of confusion when counting zeros! We have learned to express these numbers as powers of 10.

Scientific notation takes the form of $M \times 10^n$ where $1 \leq M < 10$ and "n" represents the number of decimal places to be moved. Positive n indicates the standard form is a large number. Negative n indicates a number between zero and one.

Example 1: Convert 1,500,000 to scientific notation.
We move the decimal point so that there is only one digit to its left, a total of 6 places.

$1{,}500{,}000 = 1.5 \times 10^6$

Example 2: Convert 0.000025 to scientific notation.
For this, we move the decimal point 5 places to the right.

$0.000025 = 2.5 \times 10^{-5}$

(Note that when a number starts out less than one, the exponent is always negative.)

Convert the following to scientific notation.

1. 0.005 = 5×10^{-3}
2. 5,050 = 5.05×10^{3}
3. 0.0008 = 8×10^{-4}
4. 1,000 = 1×10^{3}
5. 1,000,000 = 1×10^{6}
6. 0.25 = 2.5×10^{-1}
7. 0.025 = 2.5×10^{-2}
8. 0.0025 = 2.5×10^{-3}
9. 500 = 5×10^{2}
10. 5,000 = 5×10^{3}

Convert the following to standard notation.

1. 1.5×10^3 = 1500
2. 1.5×10^{-3} = 0.0015
3. 3.75×10^{-2} = 0.0375
4. 3.75×10^2 = 375
5. 2.2×10^5 = 220000
6. 3.35×10^{-1} = 0.335
7. 1.2×10^{-4} = 0.000 12
8. 1×10^4 = 10000
9. 1×10^{-1} = 0.1
10. 4×10^0 = 4

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MATH HANDBOOK TRANSPARENCY WORKSHEET 2

Operations with Scientific Notation

Use with Appendix B, Operations with Scientific Notation

1. Perform the following operations and express the answers in scientific notation.

a. $(1.2 \times 10^5) + (5.35 \times 10^6)$

$= 5.47 \times 10^6$

b. $(6.91 \times 10^{-2}) + (2.4 \times 10^{-3})$

$= 7.15 \times 10^{-2}$

c. $(9.70 \times 10^6) + (8.3 \times 10^5)$

$= 1.053 \times 10^7$

d. $(3.67 \times 10^2) - (1.6 \times 10^1)$

$= 3.51 \times 10^2$

e. $(8.41 \times 10^{-5}) - (7.9 \times 10^{-6})$

$= 7.62 \times 10^{-5}$

f. $(1.33 \times 10^5) - (4.9 \times 10^4)$

8.4×10^4

2. Perform the following operations and express the answers in scientific notation.

a. $(4.3 \times 10^8) \times (2.0 \times 10^6)$

8.6×10^{14}

b. $(6.0 \times 10^3) \times (1.5 \times 10^{-2})$

9.0×10^1

c. $(1.5 \times 10^{-2}) \times (8.0 \times 10^{-1})$

1.2×10^{-2}

d. $\dfrac{7.8 \times 10^3}{1.2 \times 10^4} = 6.5 \times 10^{-1}$

e. $\dfrac{8.1 \times 10^{-2}}{9.0 \times 10^2} = 9.0 \times 10^{-5}$

f. $\dfrac{6.48 \times 10^5}{(2.4 \times 10^4)(1.8 \times 10^{-2})} = 1.5 \times 10^3$