Algebra I
Notes 10.4 Scientific Notation

Name: _____
Date: _____ Hour: __

Objectives: Recognize the need for a special notation to facilitate computation with very large and very small numbers. Perform computations using scientific notation, with and without a calculator.

Number values with a lot of zeros are hard to read and difficult to calculate. Some numbers are so large or so small that they do not even fit on a calculator's display. A special way to display very large or very small quantities is to use **scientific notation.**

A number written in scientific notation is written with two factors, a _____

times _____.

Very large values can be written as decimal values that are multiplied by (positive/negative) powers of 10.

Very small values can be written as decimal values that are multiplied by (positive/negative) powers of 10.

TO WRITE NUMBERS IN SCIENTIFIC NOTATION:

1. **Move the decimal point to the right of the first non-zero number.**
2. **Write all remaining decimal place values (except repeating zeros).**
3. **Count how many decimal places to the right or to the left you would need to move the decimal point BACK to its original position.**
   a. **If you count to the RIGHT, the exponent of 10 is POSITIVE (for very _____ values).**
   b. **If you count to the LEFT the exponent of 10 is NEGATIVE (for very _____ values).**

Write each number in scientific notation.

1. 500,000	2. 40,000,000	3. 100,000,000,000,000
4. 235,000,000	5. 170,000,000,000	6. 0.0000006
7. 0.000077	8. 0.00000000001	9. 30,000,000
10. 0.00000085	11. 0.00978	12. 0.0412

TO WRITE NUMBERS IN DECIMAL ("CUSTOMARY") NOTATION:

1. **Move the decimal point to the RIGHT if the exponent of 10 is POSITIVE; move the decimal point to the LEFT if the exponent of 10 is NEGATIVE.**
2. **Fill-in all empty decimal place values with zeros.**

A **positive** value of ten means to move the decimal point to the _____.

A **negative** value of ten means to move the decimal point to the _____.

Write each number in decimal notation.

13. 9×10^{9} 14. 6×10^{4} 15. 1.8×10^{5} 16. 2.071×10^{7}

17. 2×10^{-8} 18. 4.9×10^{6} 19. 3.001×10^{8} 20. 4×10^{-1}

21. 2.74×10^{2} 22. 8.6×10^{-3} 23. 2.07×10^{9} 24. 3×10^{-3}

TO MULTIPLY IN SCIENTIFIC NOTATION:

MULTIPLY the decimal values then ADD the exponents of 10.

25. $(4 \times 10^{8})(2 \times 10^{3})$ 26. $(3 \times 10^{2})(3 \times 10^{5})$ 27. $(3 \times 10^{3})(2 \times 10^{6})$

USING A CALCULATOR

TO ENTER NUMBERS IN SCIENTIFIC NOTATION:

1. Enter the **decimal** value.
2. Use the "**EE**" function.
3. Enter the **exponent** of 10.

28. (7×10^{5}) 29. (5.6×10^{4}) 30. (7.8×10^{-4})

TO PERFORM ALL OPERATIONS IN "SCIENTIFIC" MODE:

To **turn-on** "scientific" mode:

To **turn-off** "scientific" mode: