KEY

Scientific Notation

Scientific Notation is a shorthand way to write very large and very small numbers.

The correct form includes a number between 1 and 10 multiplied by a factor of 10.

example: $5000 = 5 \times 10 \times 10 \times 10 = 5 \times 10^3$

$50000 = 5 \times 10 \times 10 \times 10 \times 10 = 5 \times 10^4$

Notice that each time we move the decimal point one place to the right, we are multiplying by 10.

What about small numbers less than one? $0.05 = 5 \times 10^{-2}$

$0.005 = 5 \times 10^{-3}$

$0.0005 = 5 \times 10^{-4}$

Notice that when we move the decimal place to the left, the exponent is negative. That means that we are dividing by 10, or **multiplying by one-tenth (0.1).**

General Rule to Remember:

a. If the number is **greater than one**, the exponent is **positive**.

b. If the number is **less than one**, the exponent is **negative**.

A. Express the following in correct scientific notation.

1) 0.000030 3.0×10^{-5} 2) 8,000,000 8×10^{6} 3) 55,000,000 5.5×10^{7}

4) 0.002 2×10^{-3} 5) 0.0000074 7.4×10^{6} 6) 65,000 6.5×10^{4}

7) 0.14 1.4×10^{-1} 8) 2,250,000 2.25^{6} 9) 0.0042 $4.2 \times 10^{=3}$

10) 26.23 2.623×10^{1} 11) 0.0918 9.18×10^{-2} 12) 0.0560 5.6×10^{-2}

13) 21.0 2.1×10^{1} 14) 0.003320 3.32×10^{-3} 15) 3210 3.21×10^{3}

B. Convert to expanded notation.

1) 5.1×10^3 5100 2) 3.04×10^{-5} 0.0000304 3) 1.634×10^5 163400

4) 4.17×10^{-1} 0.417 5) 5.43×10^4 54300 6) 7.90×10^{-4} 0.00079

7) 5.0×10^{-2} 0.050 8) 2.30×10^{-3} 0.0023 9) 1.2×10^2 120

10) 3.825×10^3 3825 11) 6.30×10^4 63000 12) 2.3×10^{-2} .023