GUIDED NOTES (MODEL NOTES)

Standard Notation to Scientific Notation

Step 1) Find the first *nonzero* digit and place the decimal after it.

Step 2) Count how many places the decimal moves to get back to the *original number*.

Step 3) Write the number as: $\boxed{Decimal\ Number} \times 10^{\boxed{exponent}}$

Step 4) Determine the exponent:

- If the number is *greater* than 1, the exponent is *positive*.
- If the number is *less* than 1, the exponent is *negative*.

Significant Figures

- *"sig figs" – digits in the number that carry meaning*

Examples

Write the following numbers in scientific notation with two significant figures.

(a) 47,000

4.7×10^{4}

(b) 3,500,000

3.5×10^{6}

(c) 0.0059

5.9×10^{-3}

(d) 0.000082

8.2×10^{-5}

Scientific Notation to Standard Notation

Step 1) Look at the *exponent* of the 10.

Step 2) Move the decimal in the number:

- To the *right* if the exponent is positive.
- To the *left* if the exponent is negative.

Step 3) Add *zeros* if needed to fill in missing places.

Examples

Write the following numbers in standard notation with two significant figures.

(a) 9.4×10^{-3}

0.0094

(b) 3.7×10^{-5}

0.000037

(c) 2.6×10^{7}

26,000,000

(d) 1.5×10^{4}

15,000

Comparing Numbers in Scientific Notation

- Look at the *exponents* first.
  - The number with the *larger* exponent is the greater number.

    ex.) 3.1×10^{5} $>$ 8.7×10^{3} **ex.)** 9.2×10^{-2} $>$ 2.4×10^{-6}

  - If the *exponents* are the same, compare the *decimal values*.

    The number with the *larger* decimal is the greater number.

    ex.) 2.4×10^{5} $<$ 5.1×10^{5} **ex.)** 8.0×10^{-6} $>$ 1.3×10^{-6}

Watch out for negative exponents!