

9/23/15 - Communication Through Numbers

	Date: Topic
Term	Notes
Formula	
Summarize the big idea	

Review Certain digit = Smallest increment represented by a line

Estimated digit = the digit represented by the position on or between the lines

on is represented by a zero

between is represented by 1-9

Significant Figures = Sigfigs = Sf

Represent the certain + estimated digits from equipment.

Rules:

- ① All non-zero # are sigfig.
- ② a sandwiched zero is sigfig. $502 \rightarrow 3\text{sf}$
 $700009 \rightarrow 6\text{sf}$
- ③ all leading zeros (zeros to the left) are NOT sigfig. They are place holders.
 $0.054 \rightarrow 2\text{sf}$ $0.000068 \rightarrow 2\text{sf}$
- ④ trailing zeros (zeros to the right) without a decimal are NOT sigfigs.
 $4200 \rightarrow 2\text{sf}$ $8000000 \rightarrow 1\text{sf}$
- ⑤ behind, behind - zeros to the left with a decimal are sigfig.

$4200. \rightarrow 4\text{sf}$ $5.6000 \rightarrow 5\text{sf}$

$52.60 \rightarrow 4\text{sf}$

Practice: (odds from homework)

- | | | |
|--------------------|-------------------|-----------------------|
| 1. 5.432 <u>4</u> | 7. 429.3 <u>4</u> | 13. 2500 <u>2</u> |
| 3. 0.0023 <u>2</u> | 9. 35.08 <u>4</u> | 15. 0.920 <u>3</u> |
| 5. 7.500 <u>4</u> | 11. 146 <u>3</u> | 17. 99.9 <u>3</u> |
| | | 19. 48.57193 <u>7</u> |

Adding/Subtracting using Sig figs

- ① Write the # in a column and determine the "weakest" link -
- ② Complete math as usual
- ③ Cut answer down based on sig figs.

Practice ①

$$\begin{array}{r} 12 \text{ km} \leftarrow \text{weakest link} \\ 0.031 \text{ cm} \\ + 7.969 \text{ cm} \\ \hline 20.000 \text{ cm} \end{array} \quad \text{ans} = 20. \text{ cm}$$

$$\begin{array}{r} 289 \text{ g} \\ - 43.7 \text{ g} \\ \hline 245.3 \text{ g} \end{array} \quad \text{ans} = 245. \text{ g}$$

Multiplying/Dividing using sig figs:

- ① Observe all # in the problem, determine the # of sf for each typed #.
- ② perform math as usual.
- ③ Change answer to match smallest # of sf from step ①.

Example: The student found the mass of the marble to be 7.46 g and the volume to be 3.8 mL , what is the density?
 $D = \frac{7.46 \text{ g}}{3.8 \text{ mL}} = 2.015789474 \text{ g/mL} \rightarrow 2.0 \text{ g/mL}$ (ans \rightarrow 2 sf)

Practice

① 11.6 cm^2 ④ $570. \text{ km}$ ② $17.3 \text{ cm} \times 6.2 \text{ cm} = 107.26 \text{ cm}^2$
 ③ 3.7 m^2 ⑤ 7.1 mm $\xrightarrow{\text{place holder}}$

Scientific Notation: Changes standard notation to a power of ten.

$\text{Coefficient} \times 10^n$ $10^n \leftarrow$ negative # the standard notation is a decimal
 1-9 $10^n \leftarrow$ positive # the standard notation is > 1

$5.3 \times 10^{-3} \rightarrow 0.0053$ $5.3 \text{ EE } -3$

$6.72 \times 10^9 \rightarrow 6,720,000,000$

Texas Instruments $\boxed{\times 10} \rightarrow \boxed{\text{EE}}$
 Other $\boxed{\times 10} \rightarrow \boxed{\text{EXP}}$

$(1.23 \times 10^{-5}) \times (7.9 \times 10^4) = 9.717 \times 10^1$

Homework: Front pg All Evens, back top 2 sections - Even.