[5.3] Operations with Significant Figures

Addition	
Subtraction	
Multiplication	
Division	

Hebden Textbook
Pages: 36 - 40

Rules for Adding and Subtracting

Example:

$$\begin{array}{r} 4.73 \\ +3.156 \\ \hline 7.886 \end{array}$$

Even though we don't include the third decimal place, we still need to take into account its value

→ **7.89**

Rule: After adding/subtracting, round off the answer to the **least** decimal places contained in the calculation

Rules for Adding and Subtracting

Example:

$$\begin{array}{r} 101.98 \\ -\ \ 41.156 \\ \hline 60.824 \end{array} \longrightarrow \boxed{60.82}$$

Rule: After adding/subtracting, round off the answer to the **least** decimal places contained in the calculation

Practice Problems

A) 5.63
0.024
+ 1.6470

B) 873.6 – 42.17=

C) 2.33
0.00041
+ 55.0009

D) 78.000 - 40=

Practice Problems

A) 5.63
0.024
+ 1.6470
7.30

B) 873.6 – 42.17 = **831.4**

C) 2.33
0.00041
+ 55.0009
57.33

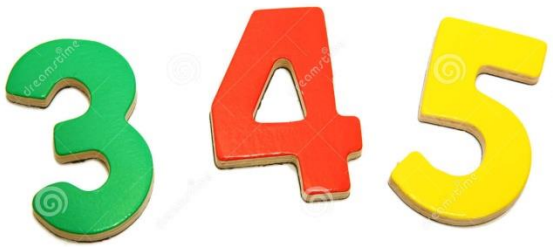
D) 78.000 – 40 = **38**

Rules for Multiplying and Dividing

Example: **$2.00 \times 6.00000000 = 1.20 \times 10^{1}$**

3 Sig Figs **9 Sig Figs** **3 Sig Figs**

Rule: After multiplying/dividing round off the answer to the **least number of significant figures** contained in the calculation.



Rules for Multiplying and Dividing

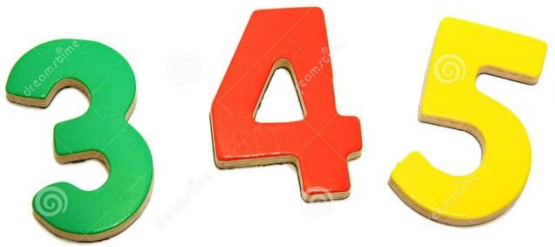
Example: $\dfrac{12568700}{455.00} = 27624$

6 Sig Figs ← 12568700

5 Sig Figs ← 455.00

27624 → 5 Sig Figs

Rule: After multiplying/dividing round off the answer to the **least number of significant figures** contained in the calculation.



Practice Problems

A) $263.12 \times 120 =$

B) $3800/18.00 =$

C) $48.603 \times 8.91578 =$

D) $3.261 \times 10^{-5} \times 1.789 =$

Practice Problems

A) $263.12 \times 120 = \mathbf{3.2 \times 10^{4}}$

B) $3800/18.00 = \mathbf{2.1 \times 10^{2}}$

C) $48.603 \times 8.91578 = \mathbf{433.33}$

D) $3.261 \times 10^{-5} \times 1.789 = \mathbf{5.834 \times 10^{-5}}$

Combing Multiplication/Division with Addition/Subtraction

Brackets ( )

Exponents ^{2}

Division ÷

Multiplication ×

Do these first, and follow rules

Addition +

Subtraction -

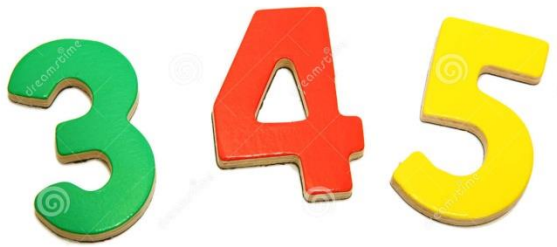
Do these second, and follow rules

Practice Problem #1

Using sig figs calculate:

$$3.458 - 2.00 \times 1.8$$

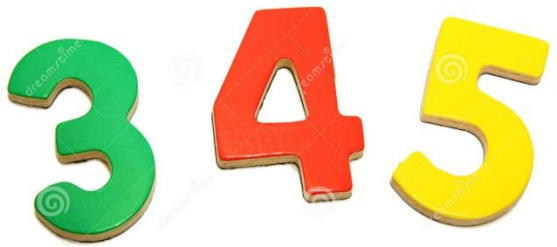
$$3.458 - 3.6 = -0.1$$



Practice Problem #2

Using Sig Figs Calculate for x:

$$X = 25.0 \times 0.1000 - 15.870 \times 0.1036$$



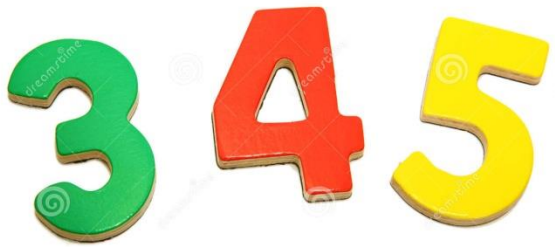
Practice Problem #2

Using Sig Figs Calculate for x:

$$X = 25.0 \times 0.1000 - 15.870 \times 0.1036$$

$$X = 2.50 - 1.644$$

$$X = 0.86$$



HOMEWORK

- See Handout for homework questions!