#1 When reading a measuring instrument, read to the ACTUAL PRINTED LINE plus, the next IMAGINED LINE.

You ALWAYS MUST ADD ONE MORE LINE THAN IS VISIBLE.

#2 PRECISION is a measurement of how many decimal places your instrument goes.

example

18.7 ← less precise

18.713

#3 How to divide and multiply using significant figures.

$3.3 \div 3.8 = 1.86842 \approx 0.87$

TWO SIG FIGS — TWO SIG FIGS

RULE for [×] or [÷] the answer cannot have more sig figs than the worst number that was calculated.

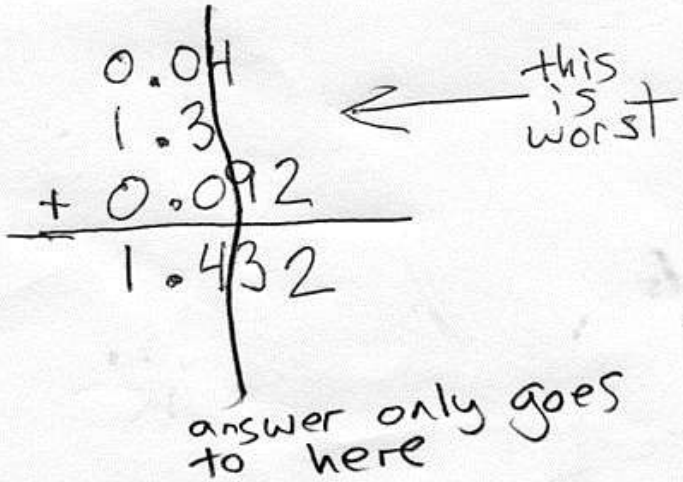
$1.56 \times 0.0003 = 0.000468 \approx 0.0005$

three — one sig fig — can have one sig fig

RULE

Rule for [+] and [−]

Your answer can only have digits as far right from the decimal dot as the worst number calculated



Answer = 1.4

Significant figures TWO

EHS CA3MIS+RY

Mr. Genest

Name ANSWERS

Date _____

visit http:genest.weebly.com

Determine the number of significant figures in the following measurements. Or write 'Infinite' if there are infinite significant figures

1) 100.1 g four

2) 473 mL three

3) 0.002 m one

4) 4200 km two

5) 330 mL of Pepsi two

6) Circle any things below that have INFINITE significant figures.

one student weighs 88.5 kg and the other weighs 90.0 kg

1 meter is the same as 100 cm

1 dozen daisies is 12 daisies

East high school contains 3,449,339 bricks

There are 28 students in the room

Round each of the following to 3 significant figures.

13) 23.15 g ~~four~~ 23.2

14) 16.2455 m ~~five~~ 16.2

15) 93.45 cm ~~four~~ 93.5

16) 21.15 cm ~~four~~ 21.2

Determine the number of significant figures in the following measurements. Or write 'Infinite' if there are infinite significant figures

7) 0.00020 two

8) 842.0 cm four

9) 640,002 m six

10) 10,000 s one

11) 190.60 g five

12) 1.0004230 g eight

Round each of the following to 3 significant figures.

17) 1.2793 kg 1.28

18) 0.10625 0.106

19) 0.0037486 m 0.00375

20) 0.01245 s 0.0125

21) 0.10652 g 0.107

HINTS for unicyle homework

Round each number to the nearest hundred.

1)	332	300	6)	533	
2)	327	300	7)	749	
3)	859	900	8)	484	
4)	777		9)	749	
5)	863		10)	734	

Round each number to the nearest hundred.

1)	9,551	9600	6)	7,474	
2)	5,379		7)	6,326	
3)	1,425		8)	9,984	
4)	6,947		9)	6,298	
5)	3,196		10)	1,751	

want a better explanation of today's lesson? read these pages from the textbook, below:

Addition and Subtraction The answer to an addition or subtraction calculation should be rounded to the same number of decimal places (not digits) as the measurement with the least number of decimal places. Work through Sample Problem 3-3 below which provides examples of rounding in addition and subtraction calculations.

Sample Problem 3-3

Perform the following addition and subtraction operations. Give each answer to the correct number of significant figures.

a. 12.52 meters + 349.0 meters + 8.24 meters

b. 74.626 meters − 28.34 meters

1. *ANALYZE* *Plan a problem-solving strategy.*

Perform the required math operation and then analyze each measurement to determine the number of decimal places required in the answer.

2. *SOLVE* *Apply the problem-solving strategy.*

Round the answers to match the measurement with the least number of decimal places.

a. Align the decimal points and add the numbers.

$$\begin{array}{rr} 12.52 & \text{meters} \\ 349.0 & \text{meters} \\ +\ 8.24 & \text{meters} \\ \hline 369.76 & \text{meters} \end{array}$$

The second measurement (349.0 meters) has the least number of digits (one) to the right of the decimal point. Thus the answer must be rounded to one digit after the decimal point. The answer is rounded to 369.8 meters, or 3.698×10^2 meters.

b. Align the decimal points and subtract the numbers.

$$\begin{array}{rr} 74.626 & \text{meters} \\ -\ 28.34 & \text{meters} \\ \hline 46.286 & \text{meters} \end{array}$$

The answer must be rounded to two digits after the decimal point to match the second measurement. The answer is 46.29 meters, or 4.629×10^1 meters.

3. *EVALUATE* *Do the results make sense?*

The mathematical operations have been correctly carried out and the resulting answers are reported to the correct number of decimal places.

Practice Problems

9. Perform each operation. Give your answers to the correct number of significant figures.

a. 61.2 meters + 9.35 meters + 8.6 meters
79.2 meters

b. 9.44 meters − 2.11 meters
7.33 meters

c. 1.36 meters + 10.17 meters
11.53 meters

d. 34.61 meters − 17.3 meters
17.3 meters

10. Find the total mass of three diamonds that weigh 14.2 grams, 8.73 grams, and 0.912 gram. 23.8 grams

Chem ASAP!

Problem-Solving 10

Solve Problem 10 with the help of an interactive guided tutorial.

Multiplication and Division In calculations involving multiplication and division, you need to round the answer to the same number of significant figures as the measurement with the least number of significant figures.

You can see in **Figure 3.9** that the calculator answer (5.7672) must be rounded to three significant figures because each measurement used in the calculation has only three significant figures.

The position of the decimal point has nothing to do with the rounding process when multiplying and dividing measurements. The position of the decimal point is important only in rounding the answers of addition or subtraction problems.

Figure 3.9

This calculator was used to multiply the length and width measurements of a bolt of fabric, 3.24 meters by 1.78 meters, each of which has three significant figures. The area of the fabric is really not known with the precision suggested by the calculator. What is the product when correctly rounded?

Sample Problem 3-4

Perform the following operations. Give the answers to the correct number of significant figures.

a. 7.55 meters × 0.34 meter
b. 2.10 meters × 0.70 meter
c. 2.4526 meters ÷ 8.4
d. 0.365 meter ÷ 0.0200

1. ***ANALYZE*** ***Plan a problem-solving strategy.***
Perform the required math operation and then analyze each of the original numbers to determine the correct number of significant figures required in the answer.

2. ***SOLVE*** ***Apply the problem-solving strategy.***
Round the answers to match the measurement with the least number of significant figures.

a. 7.55 meters × 0.34 meter = 2.567 square meters = 2.6 square meters
(0.34 meter has two significant figures.)

b. 2.10 meters × 0.70 meter = 1.47 square meters = 1.5 square meters
(0.70 meter has two significant figures.)

c. 2.4526 meters ÷ 8.4 = 0.291 976 meter = 0.29 meter
(8.4 has two significant figures.)

d. 0.365 meter ÷ 0.0200 = 18.25 meters = 18.3 meters
(Both numbers have three significant figures.)

3. ***EVALUATE*** ***Do the results make sense?***
The mathematical operations have been performed correctly, and the resulting answers are reported to the correct number of places.

Practice Problems

11. Solve each problem. Give your answers to the correct number of significant figures and in scientific notation.
a. 8.3 meters × 2.22 meters
1.8×10^{1} square meters
b. 8432 meters ÷ 12.5
6.75×10^{2} meters
c. 35.2 seconds × 1 minute/60 seconds
5.87×10^{-1} minute

12. Calculate the volume of a warehouse that has inside dimensions of 22.4 meters by 11.3 meters by 5.2 meters. (Volume = $l \times w \times h$)
1.3×10^{3} cubic meters

Chem ASAP!

Problem-Solving 12
Solve Problem 12 with the help of an interactive guided tutorial.