

Warm Up

According to the scientific method, what must you do if your experiment does NOT support your theory?

- a) ignore it
- b) write a report
- c) revise your hypothesis
- d) create a theory

Warm Up

What do you think are some ways chemicals get into your body when you are working with them?
(Routes of ingestion.)

Safety Test Today!

Objective(s) for the day:

The Student will be able to (TSWBAT):

- 1. Determine which numbers are significant and which are not.**
- 2. Carry out calculations such as multiplication and division using the rules of significant figures.**



Significant Figures Rules

Rule	Example of Measured Numbers	Number of Significant Figures
------	-----------------------------	-------------------------------

1. A number **is** a significant figure if it is:

a. not a zero

4.5 g	2
122.35 m	5

b. a zero between nonzero digits

205 m	3
5.082 kg	4



Rule	Example of Measured Numbers	Number of Significant Figures
------	-----------------------------	-------------------------------

1. A number **is** a significant figure if it is:

c. a zero at the end of a decimal number OR sandwiched between a number and a decimal point	16.00 g	4
	25.0 °C	3
	50. L	2

d. the digits in the coefficient of a number written in scientific notation

4.0×10^5	2
5.70×10^{-3}	3



Rule	Example of Measured Numbers	Number of Significant Figures
------	-----------------------------	-------------------------------

2. A zero *is not significant* if it is:

a. at the beginning of a decimal number

0.0004 lb	1
0.075 m	2

b. used as a place holder in a large number without a decimal point

850000	2
1250000	3



Determining Significant Figures in Measurements: How many sig. figures are in each measurement?

a. 123 m

b. 40,506 mm

c. 9.8000×10^4 m

d. 22 meter

sticks

e. 0.07080 m

f. 98,000 m



How many significant figures are in each measurement?

a. 143 grams

b. 0.074 meter

c. 8.750×10^{-2}

d. 1.072 meter



*How many significant figures
are in the following numbers:*

0.000100



1.001



100



100.



Warm Up

What is the density of an object with a volume of 24.5 cm^3 and a mass of 14.5 g ?

Get a calculator!

Calculations Using Significant Figures

Calculations cannot **MAKE** your answer more precise. Precision depends on how you made your measurements.



If you have one very **imprecise** instrument in your experiment, the imprecise instrument **LIMITS** the overall precision, so you **ROUND OFF** your calculations.

Remember! Significant figures are used to **COMMUNICATE!**



Rounding

To round a number, you must first decide how many significant figures your answer should have. The answer depends on the given measurements and on the mathematical process used to arrive at the answer.



Rounding Measurements

Round off each measurement to the number of significant figures shown in parentheses. Write the answers in scientific notation.

a. 314.721 m (four)



b. 0.001775 m (two)



c. 8792 m (two)



Warm Up

Calculate the density of a material with a volume of 37.9 cm^3 and a mass of 17.7 g .

Get a calculator!

Round each measurement to three significant figures. Write your answer in scientific notation.

a. 87.073 meters



b. 4.3621×10^8 meters



c. 0.01552 meter



d. 9009 meters



e. 1.7777×10^{-3} meter



f. 629.55 meters



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.



Significant Figures in Addition

Calculate the sum of the three measurements. Give the answer to the correct number of significant figures.

$$12.52\text{m} + 349.0\text{m} + 8.24\text{m}$$



Warm Up

How many significant figures are in the following measurements?

1. 0.002020

2. 7.6020

3. 3000

4. 3000.

Warm Up for Block 2

Round to 3 sig figs & convert to scientific notation:

1. 0.001002

2. 1001


3. 1.9786


4. 0.014795


Practice Problems:

Express each answer to the correct significant figures:

1. $61.2 \text{ m} + 9.35 \text{ m} + 8.6 \text{ m} =$ 

2. $9.44 \text{ m} - 2.11 \text{ m} =$ 

3. $1.36 \text{ m} + 10.17 \text{ m} =$ 

4. $34.61 - 17.3 \text{ m} =$ 



Multiplication and Division:

Answers must be rounded to the same number of significant figures as the measurement with the least number of significant figures.



Practice:

a. $7.55 \text{ m} \times 0.34 \text{ m} =$ 

b. $2.10 \text{ m} \times 0.70 \text{ m} =$ 

c. $2.4526 \text{ m} / 8.4 \text{ m} =$ 



Practice Problems:

p. 71, problems 7 & 8