Questions

1. Determine the amount of signifcant figures in the following numbers.

1.00	0.13	0.89201	0.705
3	2	5	3
50.	**37.0**	**5600**	**5600.**
2	3	2	4

2. Complete the following mathematic problems.

a. 31.1 s
- 2.461 s
28.6 s

b. 24.82 kg
4.7 kg
+ 2 kg
32 kg

c. 2.22 cd x 4.0 =
8.9 cd

d. 50 m / 10.0 m =
5

3. Tilda Earth is measuring the mass of an apple. She performs 5 trials and her data is shown below.

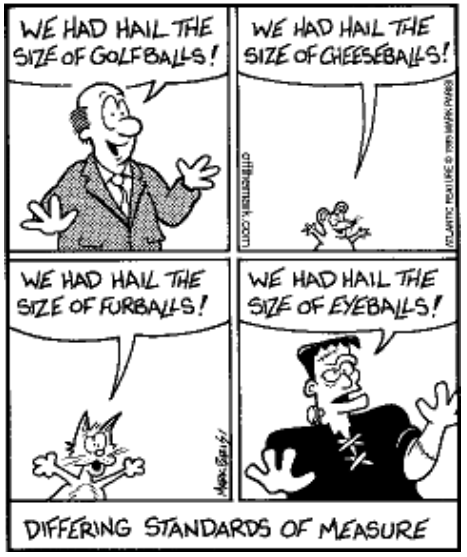
0.2328 kg	0.2298 kg	0.2334 kg	0.2289 kg	0.2314 kg

a. Calculate the range of her data.
High – Low = 0.2334 kg – 0.2289 kg = 0.0045 kg

b. Calculate the mean of her data.
Mean = sum/#trials = 1.1563 kg/5 = 0.2313 kg

c. Calculate the uncertainty in the mean of her data.
Uncert = range/#trials = 0.0045 kg / 5 trials = 0.00090 kg

Measurements & Mathematics



Name Answer Key

Definitions

1. Unit - a standard quantity with which measurements can be compared.
2. SI System - an internationally recognized system that provides standardized units for scientific measurements
3. Derived Unit - combinations of two or more fundamental units and are used to simplify notation
4. Scientific Notation - consists of a number equal to or greater than one and less than ten followed by a multiplication sign and the base ten raised to some integral power
5. Prefix - a symbol preceding the base unit to form a new unit that is larger or smaller than the base unit by a multiple or submultiples of 10
6. Accuracy - a measurement very close to the accepted value found in a handbook
7. Precision - measurements taken of the same event are nearly identical
8. Range - The range is the highest value minus the lowest value
9. Mean - The mean is the arithmetic average
10. Uncertainty in the mean - This is the range divided by the number of data values

Equations (NOT on Reference Tables)

1. $\frac{\text{Experimental - Accepted}}{\text{Accepted}} \times 100\% = \text{Percent Error}$
2. Range = High - Low
3. $mean = \frac{sum}{\#\,trials}$
4. $\text{uncertainty} = \frac{range}{\#\,trials}$
5. $m = \frac{\Delta y}{\Delta x}$

List the following SI Prefixes, their symbols, and their notation.

Prefix	Symbol	Notation
Tera	T	10^{12}
Giga	G	10^{9}
Mega	M	10^{6}
Kilo	k	10^{3}
Deci	d	10^{-1}
Centi	c	10^{-2}
Milli	m	10^{-3}
Micro	μ	10^{-6}
Nano	n	10^{-9}
Pico	p	10^{-12}

Use dimensional analysis to convert the following values:

a. 70. km/hr to m/s

$$\frac{70.\text{ km}}{\text{hr}}\left(\frac{10^{3}\text{ m}}{1\text{ km}}\right)\left(\frac{1\text{ hr}}{60\text{ min}}\right)\left(\frac{1\text{ min}}{60\text{ s}}\right) = 19\text{ m/s}$$

b. 54.8 pg (picograms) to mg (milligrams)

$$54.8\text{ pg}\left(\frac{10^{-12}\text{ g}}{1\text{ pg}}\right)\left(\frac{1\text{ mg}}{10^{-3}\text{ g}}\right) = 5.48\times10^{-8}\text{ mg}$$