EZPZ Review: Unit 1

This is called an "E-Z-P-Z" Review. This review only hits the basic and foundation of the unit.
The extended and more difficult questions were on your QUEST homework so look there! ☺
This is just to make sure you at least know the **basics**!

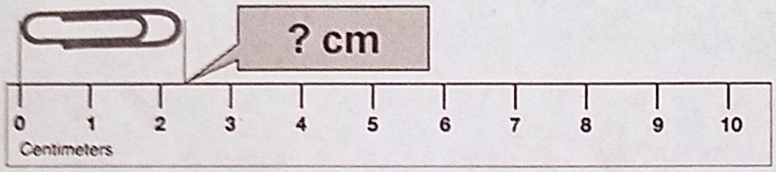
1. Consider the results of three students who repeatedly weighed a lead block known to have a **true mass** of 10.00 g (indicated by the solid horizontal blue line on the graphs).

	Student A	Student B	Student C
Trial 1	10.49 g	9.78 g	10.03 g
Trial 2	9.79 g	9.82 g	9.99 g
Trial 3	9.92 g	9.75 g	10.03 g
Trial 4	10.31 g	9.80 g	9.98 g
Average	10.13 g	9.79 g	10.01 g

   a. Which student was both inaccurate and imprecise? A
   b. Which student was accurate and precise? C
   c. Which student was inaccurate, but precise? B

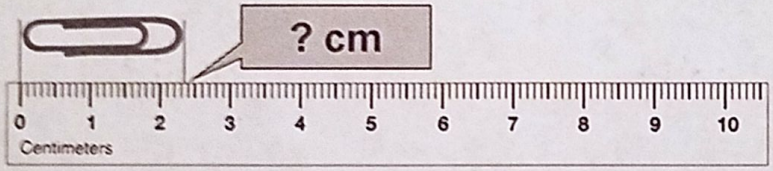
2. Measure or calculate to the correct number of significant figures:

a.



2.3 cm

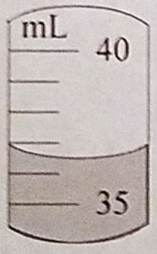
b.



2.35 cm

c.

Graduated cylinder



36.5 mL

d. 0.355 + 105.1 – 100.5820 = 4.9

e. 2.345 + 0.07 + 2.9975 = 5.41

f. 2.380 x 7.1 = 16.

g. (3.102 – 1.23) /0.782 = 2.39 (1.872)

h. 5.6 x 2.12 – 1.05 = 11 (11.872)

i. [(1.428 – 1.08)/0.288] + (2.83 x 0.360) = 2.23 (0.348; 1.20833 + 1.0188)

3. A student measured a mass to be 250. But the actual mass was 240. g. What is the percent error (in the correct number of sig figs)?

$$\frac{(240.\text{g} - 250.\text{g})}{240.\text{g}} \times 100. = \frac{(-10.)}{240.} \times 100. = -4.2\%$$

$592\,\mu m \times \frac{1\ m}{10^6\ \mu m} \times \frac{10^3\ mm}{1\ m} = \boxed{0.592\ mm}$

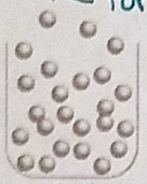
4. Convert:
   a. 592 µm to mm
   b. 2.31 kg to g
   c. 0.980 dL to cL

$2.31\ kg \times \frac{1000\ g}{1\ kg} = \boxed{2310\ g}$

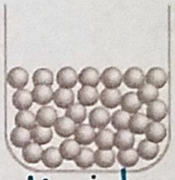
$0.980\ dL \times \frac{1\ L}{10\ dL} \times \frac{100\ cL}{1\ L} = \boxed{9.80\ cL}$

5. States of Matter: Matching! Label each property as solid (s), liquid (l), or gas (g). Some questions may have more than one correct answer! Each answer may be used more than once!

a) l,g Particles take the shape of their container.
b) s,l Particles have definite volume.
c) g Particles have indefinite volume.
d) g Particles may easily be squished closer together.
e) s Particles keep their own shape no matter what container they're in.
f) s Particles have definite shape.
g) s Particles are the least compressible.
h) g Particles spread out to fill their entire container.
i) aq Particles of the substance are dissolved in water. ← for aqueous!
j) l Particles flow past each other.
k) g Particles are the most compressible.
l) l,g Particles have indefinite shape.
m) g Particles move all over.
n) s One example is paper.
o) s,l Particles keep their own volume no matter what container they're in.
p) s Particles cannot be squished closer together.
q) g Particles can compress to fit into a smaller container.

r)  gas

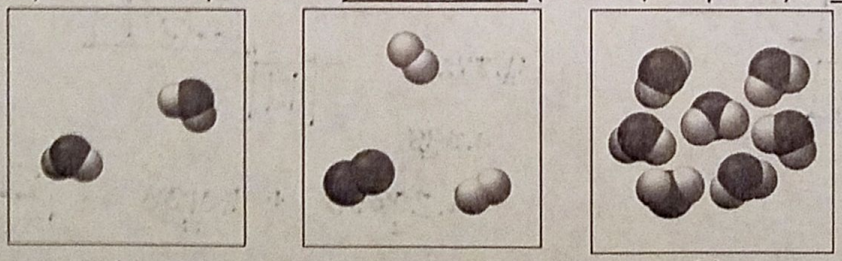
s)  solid

t)  liquid

6. Identify each of the following as: element (E), compound (C), heterogeneous (He) or homogeneous (Ho).

a) Air Ho
b) Chlorine (Cl_2) E
c) Carbon dioxide (CO_2) C
d) Granite He
e) Salt Water Ho
f) Liquid nitrogen (N_2) E
g) Concrete He
h) Apple Juice Ho
i) Sand He
j) Glucose C
k) Carbon (C) E
l) Pure water C

7. Classify whether the picture is a **pure substance** (element/compound) or **mixture** (homo/hetero):



(a) Pure (compound)
(b) Mixture
(c) Pure (compound)

8. Determine if it is a physical or chemical change.

a) Iron rusts from exposure to the oxygen gas in the air, forming reddish brown flakes.

$$Fe(s) + O_2(g) \rightarrow FeO_2(s)$$

Chemical - oxidation

b) Delicious sugar (glucose) is dissolved into tea.

$$C_{22}H_{18}O_{11}(aq) + C_6H_{12}O_6(s) \rightarrow C_{22}H_{18}O_{11}(aq) + C_6H_{12}O_6(aq)$$

Physical - identities do not change, only state of matter

c) Hydrogen peroxide decomposes into hydrogen gas and oxygen gas.

$$H_2O_2(l) \rightarrow H_2(g) + O_2(g)$$

Chemical - decomposition

d) Ethanol evaporates.

$$C_2H_6O(l) \rightarrow C_2H_6O(g)$$

Physical - identity doesn't change, only state of matter

9. Determine if it a physical OR a chemical property. Determine if it is an extensive OR an intensive property.

Property	Physical Property	Chemical Property	Extensive Property	Intensive Property
magnetism	✓			✓
malleability (can be hammered thin without breaking)	✓			✓
temperature	✓			✓
flammability		✓		✓
red color	✓			✓
reacts violently with sodium		✓		✓
length	✓		✓	
mass	✓		✓	
produces a different gas when heated (decomposition)		✓		✓
dissolves in water	✓			✓
rough texture	✓			✓
sweet taste	✓			✓
density	✓			✓
toxicity		✓		✓
sour taste	✓			✓
melting point	✓			✓
boiling point	✓			✓
hardness	✓			✓
luster (how shiny it is)	✓			✓
odor	✓			✓

10. Density:

- **a.** Calculate the density of mercury if 1.00×10^2 g occupies a volume of 7.36 cm^3.
- **b.** What is the volume of water if the mass of water in a container is 212.1g?
  - i. What is the density of water?
  - ii. Would charcoal float in water? (Use the chart below)
- **c.** If the mass of an unknown object is 115.92g and the volume is 6.00cm^3, what is the density?
  - i. Using the chart below, identify the unknown object.

a) $D = \frac{m}{V}$

$= \frac{1.00 \times 10^2 \text{ g}}{7.36 \text{ cm}^3}$

$D = 13.6 \text{ g/cm}^3$

TABLE 1.4 The Density of Some Common Substances at 20 °C

Substance	Density (g/cm^3)
Charcoal (from oak)	0.57
Ethanol	0.789
Ice	0.917 (at 0 °C)
Water	1.00 (at 4 °C)
Sugar (sucrose)	1.58
Table salt (sodium chloride)	2.16
Glass	2.6
Aluminum	2.70
Titanium	4.51
Iron	7.86
Copper	8.96
Lead	11.4
Mercury	13.55
Gold	19.3
Platinum	21.4

b) $D = \frac{m}{V}$

$1.00 \text{ g/mL} = \frac{212.1 \text{ g}}{V}$

$V = \frac{212.1 \text{ g}}{1.00 \text{ g/mL}}$

$V = 212.1 \text{ mL}$

i) 1.00 g/mL

ii) $0.57 < 1.00$

yes - charcoal would float

c.i) $D = \frac{m}{V}$

$D = \frac{115.92 \text{ g}}{6.00 \text{ cm}^3}$

$D = 19.3 \text{ g/cm}^3$

ii) Gold