Nature of Numbers Unit Practice - DO NOT WRITE ON THIS SHEET

1. Define the terms “accuracy” and “precision”.

2. Draw a target diagram that shows precision but not accuracy

3. Draw a target diagram that shows accuracy but not precision

4. Draw a target diagram that shows both accuracy and precision

5. Each of five students used the same ruler to measure the length of the same pencil. These data resulted: 15.33 cm, 15.34 cm, 15.33 cm, 15.33 cm, 15.34 cm. The actual length of the pencil was 15.85 cm. Describe whether accuracy and precision are each good or poor for these measurements.

6. Why are significant figures important when taking data in the laboratory?

7. Why are significant figures NOT important when solving problems in your math class?

8. Using two different instruments, I measured the length of my foot to be 27 centimeters and 27.00 centimeters. Explain the difference between these two measurements.

9. State the number of significant figures in each of the following.

a) 3.57 m

b) 20.040 g

c) 0.004 m^3

d) 730 000 kg

e) 12 700. mL

f) 30 ***atoms***

g) 0.6034 g/mL

h) 19.0 s

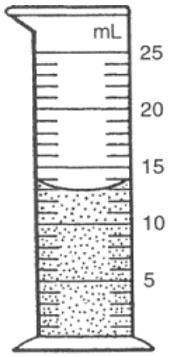
i) 810 ^oC

j) 0.0100 mol

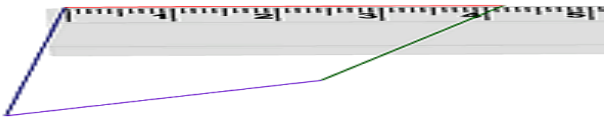
10. Make measurements use the pictures on the right. Show the correct number of significant figures.

a. Temperature in ^oC (close up of thermometer)

b. Volume in mL (graduated cylinder)



c. Length of line in cm (ruler)



11. Determine the number of significant figures in each of the following:

a) 3427	**b) 0.00456**	**c) 123,453**
d) 172	**e) 0.000984**	**f) 0.502**
g) 3100.0×10^{2}	**h) 0.0114×10^{4}**	**i) 107.2**
j) 0.0000455	**k) 2205.2**	**l) 30.0×10^{-2}**
m) 0.982×10^{-3}	**n) 0.0473**	**o) 650.502**
p) 3.03×10^{-1}	**q) 20.4×10^{5}**	**r) 1.29**
s) 0.00565	**t) 1362205.2**	**u) 450.0×10^{3}**
v) 1000×10^{-3}	**w) 546,000 $\pm$ 10**	**x) 546,000 $\pm$ 1000**

12. Convert each into decimal form.

1.56×10^{4}	**0.56×10^{-2}**	**3.69×10^{-2}**	**736.9×10^{5}**
0.00259×10^{5}	**0.000459×10^{-1}**	**13.69×10^{-2}**	**6.9×10^{4}**
0.00259×10^{3}	**0.0209×10^{-3}**		

13. Calculate the following. Give the answer in correct scientific notation and significant figures.

a) 4.53×10^{5}
$+ 2.2 \times 10^{6}$

b) 1913.0
$- 4.6 \times 10^{3}$

c) 2.34×10^{24}
$+ 1.92 \times 10^{23}$

d) 2.130×10^{3}
$- 6.6 \times 10^{2}$

e) $9.10 \times 10^{3} + 2.2 \times 10^{6}$

f) $1113.0 - 14.6 \times 10^{2}$

g) $6.18 \times 10^{-45} + 4.72 \times 10^{-44}$

h) $4.25 \times 10^{-3} - 1.6 \times 10^{-2}$

14. Calculate the following. Give the answer in correct scientific notation and significant figures.

a) $3.95 \times 10^{2} / 1.5 \times 10^{6}$

b) $(3.5 \times 10^{2})(6.45 \times 10^{10})$

c) $4.44 \times 10^{7} / 2.25 \times 10^{5}$

d) $(4.50 \times 10^{-12})(3.67 \times 10^{-12})$

e) $1.05 \times 10^{-26} / 4.2 \times 10^{56}$

f) $(2.5 \times 10^{9})(6.45 \times 10^{4})$

g) $6.022 \times 10^{23} / 3.011 \times 10^{-56}$

h) $(6.88 \times 10^{2})(3.45 \times 10^{-10})$

15. The Handbook of Chemistry and Physics lists the density of a certain liquid to be 0.7988 g/mL. Taylor experimentally finds this liquid to have a density of 0.7925 g/mL. The teacher allows up to +/- 0.500% error to make an "A" on the lab. Did Fred make an "A"? Prove your answer.

16. An object has a mass of 35.0 grams. On Anthony's balance, it weighs 34.85 grams. What is the percent error of his balance?

17. Shelby measured the volume of a cylinder and determined it to be 54.5 cm^3. The teacher told her that she was 4.25% too high in her determination of the volume. What is the actual volume of the cylinder?