Math Review

Fill in the following table for the following quantities and their symbols:

Quantity	Unit	Symbol
length	meters	m
mass		
time		
force		
energy		
power		
speed		
frequency		

Complete the following conversions

1. 4 km = _____m
2. 54 mm = _____ m
3. 0.394 Mg = _____ g
4. 4000 ms = _____ s
5. 4 dl = _____ l
6. 70 dam (deka meters) = _____ m
7. 4 Gg = _____ cg
8. 9 000 000 µm = _____ km
9. 4000 s = _____ h
10. 67 m^2 = _____ cm^2

Example 1:
3000 cm = _____ km

$$3000\ \text{cm} \times \frac{1\ \text{m}}{100\ \text{cm}} \times \frac{1\ \text{km}}{1000\ \text{m}} = \boxed{0.03\ \text{km}}$$

Example 2:
3 m^3 = _____ cm^3

$$3\ \text{m}^3 \times \frac{(100\ \text{cm})^3}{(1\ \text{m})^3} = 3\ \text{m}^3 \times \frac{(1\ 000\ 000\ \text{cm}^3)}{(1\ \text{m}^3)} = \boxed{3\ 000\ 000\ \text{cm}^3}$$

Rounding:

5 and up → round up 4.55 → 4.6
4 and down → round down 4.54 → 4.5

Significant Figures:

All non-zero numbers count.
Zeros to the left never count.
Zeros in the middle always count.
Zeros to the right count only if there is a decimal in the number.

Example: 0.00050600 This number has 5 sig figs because the four zeros to the left of the 5 don't count. The 5 and 6 count. The 0 in the middle counts. The two zeros to the right of the 6 count because there is a decimal in the number.

Example: 567, 000 This number has 3 sig figs because the 5,6,and 7 count, but the zeros to the right do not count since there is no decimal in the number.

Round the following numbers to 2 sig figs:

1. 35.67 → _____
2. 0.0004567 → _____
3. 2.34×10^4 → _____
4. 4.777×10^{-6} → _____
5. 23.333 → _____
6. 0.0102 → _____
7. 99536 → _____
8. 1.0326 → _____
9. 156.21 → _____
10. 9.75 → _____

Multiplication / Division: This is the most common rule for sig figs we will be using. Use this for all multiplication or multifunction equations. Use the **lowest number of total sig figs** in your equation for your answer.

Example: 6.5 m x 687.3 m = 4467.645 m, but because of sig figs, your answer will be 4.5×10^3 m
(2) (4) (7) (2)

Addition / Subtraction: If you have a situation where you are only using addition and / or subtraction you should use this rule for sig figs. Look at the number of **decimal places** and use the smallest number of decimal places in your answer.

Example: 3.456 s + 22.55 s = 26.006 s, but because of sig figs, your answer will be 26.01 s.
(3) (2) (3) (2)

Solve the following equations and leave the answers with the correct number of sig figs:

1. 23 + 4.8 = _____
2. 234.67 x 34 = _____
3. 4567 / 2.45 = _____
4. 2.56 + 0.89 = _____
5. 2345.8 x 23.2 = _____

Percent Uncertainty:

If something is measured to be 12.3 cm +/- 0.5 cm. What is its percent uncertainty?

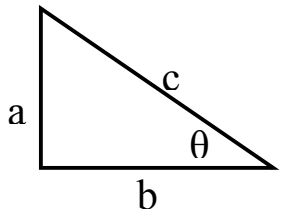
$\frac{0.5 \text{ cm}}{12.3 \text{ cm}} \times 100\% = 4\%$ uncertainty

It is important to know how big the uncertainty is compared to the actual measurement. 0.5 cm error would be a lot if your measurement was only 2.1 cm! That would amount to an error of 24% instead of only 4%
(0.5 / 2.1) x 100% = 24%

To emphasize this point, consider this; 1 cm error when you are measuring 100 000 cm isn't much, therefore almost negligible. Your calculated % error would be low. 1 cm error when you are measuring only 10 cm is a concern. Your % error would be much higher.

Trigonometry:

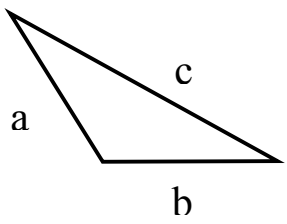
a) Right Angle Triangles



sin θ =
cos θ =
tan θ =

Pythagorean Theorem:

b) Other Triangles



Sine Law:

Cosine Law: