## Part A: Challenge problems from previous worksheet

Let's start with a few challenge problems to review the last worksheet. Here is a checklist that you might want to consider for each problem:

Does your answer have the right significant figures (if doing $x / \div$ ) or decimal places (if doing $+/-$ )? Does your answer have correct units?
Does your answer have "ambiguous zeros"? If so, how should you rewrite your answer?
Is your answer rounded off correctly?

1) Although we have not seen the formate ion $\left(\mathrm{CO}_{2} \mathrm{H}^{-}\right)$yet in class, the acid that is made from it is found in nature, primarily in the venom of bee and ant stings.
a) What is the name and formula for the acid made from the formate ion?
b) What is the formula mass of the acid made from the formate ion?
2) Report the answer to this calculation with the correct significant figures: $(16 \mathrm{~mm})(201 \mathrm{~mm})(3.1 \mathrm{~mm})$
3) A large fish tank is found to measure 72 inches long by 24 inches deep by 26 inches tall. What is the volume of the fish tank?
4) What is the formula mass of zinc acetate?

## Student name:

## Part B: Significant figures in calculations involving mixed $+/-$ and $\mathbf{x} / \div$

Performing calculations that involve a combination of both $+/$ and $\mathrm{x} / \div$ can be tricky. To report the right answer, we must carefully keep track of both significant figures (during the $\mathrm{x} / \div$ steps) and decimal places (during the $+/-$ steps). Let's go through an example together. Verify the math on your calculator and make sure you understand the explanation for each step below before moving on.
5) Perform the following calculation:

$$
\frac{(7.84-4.8)}{(6+4.27)}
$$

Step:

- Solve the operations in the parentheses first.
- Keep 1 extra significant figure until the very end.
- Highlight or underline the significant figures in each step.

Mathematics:
Numerator:
$7.84-4.8=\underline{3.04}$
Denominator:
$6+4.27=\underline{10} .27=\underline{10} .3$
-

- Solve the division portion
- Solve the division portion of the problem.
- Pay special attention to underlined portions of each number from the previous step.

Division:
$\frac{(\underline{(3.04)}}{(\underline{10.3)}}=0 . \underline{295145631}$

- Round off the answer to
the correct number of the correct number of significant figures.

Explanation:

- We are subtracting and adding numbers so we need to watch decimal places.
- Numerator: the " 4.8 " only has only 1 decimal place, so our answer for that step is the underlined 3.0 (keep the extra digit, the " 4 " until the end).
- Denominator: the " 6 " has no digits after the decimal, so our answer for that step is the underlined 10. (keep the extra digit, the " 3 " until the end).
- Now we are dividing, so we need to switch over to watching significant figures.
- The numerator has 3.0 underlined which means it has 2 sig figs.
- The denominator has 10 . underlined which means it has 2 sig figs.
- Based on the underlined numbers, our answer should have 2 sig figs.
- The " 0.29 " is rounded up to " 0.30 "

6) Complete all of the blanks in the table below as you perform the following calculation.

$$
\frac{793.104}{4.80}+\frac{2.1651}{0.35}=
$$

Step: Mathematics:


## Part C: Extra Practice if your PAL team has time

Here are a few more to practice. Note that in some cases, we are returning to calculations we have already learned how to do, but now we are also watching for correct significant figures.
7) Silver has two naturally occurring isotopes. The lighter isotope, Ag - 107 has a mass of 106.905 amu and a $51.84 \%$ abundance. What is the mass of the heavier isotope, $\mathrm{Ag}-109$ ?
8) A particular compound is found to have 95.0 g of carbon for every 8.2 g of hydrogen. How many grams of hydrogen would there be in 3505.2 g of this compound?
9) $(6745+4.78) \times 3.56=$
10) $\frac{(908.4-3.4)}{\left(3.52 \times 10^{4}\right)}=$

