



**Part B: Significant figures in calculations involving mixed +/- and x/÷**

Performing calculations that involve a combination of both +/- and x/÷ can be tricky. To report the right answer, we must carefully keep track of both significant figures (during the x/÷ 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:	Mathematics:	Explanation:
<ul style="list-style-type: none"> <li>Solve the operations in the parentheses first.</li> <li>Keep 1 extra significant figure until the very end.</li> <li>Highlight or underline the significant figures in each step.</li> </ul>	Numerator: $7.84 - 4.8 = \underline{3.04}$  Denominator: $6 + 4.27 = \underline{10.27} = \underline{10.3}$	<ul style="list-style-type: none"> <li>We are subtracting and adding numbers so we need to watch <i>decimal places</i>.</li> <li>Numerator: the "4.8" only has only 1 decimal place, so our answer for that step is the underlined <u>3.0</u> (keep the extra digit, the "4" until the end).</li> <li>Denominator: the "6" has no digits after the decimal, so our answer for that step is the underlined <u>10.</u> (keep the extra digit, the "3" until the end).</li> </ul>
<ul style="list-style-type: none"> <li>Solve the division portion of the problem.</li> <li>Pay special attention to underlined portions of each number from the previous step.</li> </ul>	Division: $\frac{\underline{(3.04)}}{\underline{(10.3)}} = 0.\underline{29}5145631$	<ul style="list-style-type: none"> <li>Now we are dividing, so we need to switch over to watching <i>significant figures</i>.</li> <li>The numerator has <u>3.0</u> underlined which means it has 2 sig figs.</li> <li>The denominator has <u>10.</u> underlined which means it has 2 sig figs.</li> </ul>
<ul style="list-style-type: none"> <li>Round off the answer to the correct number of significant figures.</li> </ul>	Answer: $0.\underline{29}5145631 = 0.30$	<ul style="list-style-type: none"> <li>Based on the underlined numbers, our answer should have 2 sig figs.</li> <li>The "0.29" is rounded up to "0.30"</li> </ul>

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:
<ul style="list-style-type: none"> <li>• Solve the quotients first.</li> <li>• Keep 1 extra significant figure until the very end.</li> <li>• Highlight or underline the significant figures in each step.</li> </ul>	<p>1<sup>st</sup> quotient:</p> $\frac{793.104}{4.80} = \underline{\hspace{2cm}}$ <p>2<sup>nd</sup> quotient:</p> $\frac{2.1651}{0.35} = \underline{\hspace{2cm}}$
<ul style="list-style-type: none"> <li>• Continue with the addition step.</li> <li>• Pay special attention to underlined portions of each number.</li> </ul>	<p>Addition:</p> $\underline{\hspace{2cm}}_{1^{\text{st}} \text{ quotient}} + \underline{\hspace{2cm}}_{2^{\text{nd}} \text{ quotient}} = \underline{\hspace{2cm}}_{\text{don't round off yet}}$
<ul style="list-style-type: none"> <li>• Round off the answer to the correct number of decimal places.</li> </ul>	<p>Final answer:</p> <p style="text-align: center;">_____</p>

**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, 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)  $\frac{(908.4 - 3.4)}{(3.52 \times 10^4)} =$