Percent Error and Percent Difference

PERCENT ERROR

When comparing an experimental result to a value determined by theory or to an accepted known value (like $g = 9.8\text{m/s}^2$) we determine the difference between the experimental value and the theoretical value as a percentage of the theoretical value. In the definition below, "theoretical" is the value that is determined from theory (i.e., calculated from physics equations) or taken as a known or accepted value like g.

$$\%\text{ error} = \frac{|\text{theoretical} - \text{experimental}|}{\text{theoretical}} \times 100\% \tag{1}$$

PERCENT DIFFERENCE

When wanting to compare two values that are both determined by experimentation, we don't have a "correct" or accepted value to which to compare, so we simply look at how different the two values are as a percentage of their average value:

$$\%\text{ difference} = \frac{|\text{value 1} - \text{value 2}|}{\left(\frac{\text{value 1} + \text{value 2}}{2}\right)} \times 100\%. \tag{2}$$