LIMITS OF ACCURACY
SUMMARY

If a number A is rounded to a specific $place\ \ value$ then the Limits of Accuracy of A are:

$$A_{UPPERBOUND} = A + \frac{place\ \ value}{2} \qquad \text{and} \qquad A_{LOWERBOUND} = A - \frac{place\ \ value}{2}$$

$$\text{So } A_{LOWERBOUND} \leq A < A_{UPPERBOUND}$$

If A is multiplied by a ***positive*** number, k, the limits of the new number, kA become:

$$kA_{LOWERBOUND} \leq kA < kA_{UPPERBOUND}$$

If A is multiplied by a ***negative*** number, $-k$, the limits of the new number, $-kA$ become:

$$-kA_{LOWERBOUND} \geq -kA > -kA_{UPPERBOUND}$$

If another number B is rounded to a specific $place\ \ value$ and the Limits of Accuracy of B are found as

$$B_{LOWERBOUND} \leq B < B_{UPPERBOUND}$$

Then the Limits of Accuracy for combinations of A and B can be found as follows:

Sum: $A_{LOWERBOUND} + B_{LOWERBOUND} \leq A + B < A_{UPPERBOUND} + B_{UPPERBOUND}$

Difference: $A_{LOWERBOUND} - B_{UPPERBOUND} \leq A - B < A_{UPPERBOUND} - B_{LOWERBOUND}$

Product: $A_{LOWERBOUND} \times B_{LOWERBOUND} \leq A \times B < A_{UPPERBOUND} \times B_{UPPERBOUND}$

Quotient: $\frac{A_{LOWERBOUND}}{B_{UPPERBOUND}} \leq \frac{A}{B} < \frac{A_{UPPERBOUND}}{B_{LOWERBOUND}}$