

Calculations Involving Significant Digits

Basically, the final answer recorded cannot be any more precise than the measurements used to determine it.

Addition + Subtraction

$$\begin{array}{r}
 125.825 \text{ m} \\
 0.1764 \text{ m} \\
 + 12.2 \text{ m} \quad \leftarrow \text{least precise} \\
 \hline
 138.2014 \text{ m} \\
 \uparrow \\
 \text{your final answer can only have 1 uncertain digit!} \\
 \hline
 \approx 138.2 \text{ m} \quad \leftarrow \text{round to 1 dec place.}
 \end{array}$$

When adding or subtracting, the final answer must be rounded to the LEAST PRECISE PLACE VALUE use in the calculation.

Multiplication + Division

$$\begin{array}{r}
 121.3 \text{ m} \quad (4 \text{ sd}) \\
 \times 5.1 \text{ m} \quad (2 \text{ sd}) \quad \leftarrow \text{least \# of sd} \\
 \hline
 1213 \\
 6065 \\
 \hline
 618.63 \text{ m}^2 \quad (2 \text{ sd}) \quad \leftarrow \text{use this in the final answer.} \\
 \uparrow \\
 \text{can only have 1 uncertain digit} \\
 \hline
 \approx 620 \text{ m}^2 \\
 (6.2 \times 10^2 \text{ m}^2) \\
 \text{is a better way to write}
 \end{array}$$

Round the final answer to the LEAST NUMBER OF SIGNIFICANT DIGITS used in the calculation.

SUMMARY

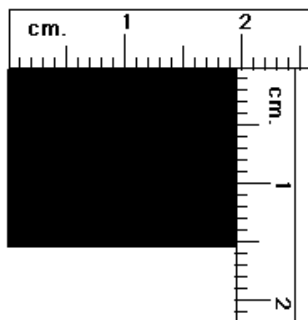
Add / Subtract \Rightarrow least precise place value.

Multiply / Divide \Rightarrow least # of sig digs.

Measurement and Significant Figures

Least count of ruler is 1 mm or 0.1 cm
doubtful digit will be to the nearest 0.01 cm.

Actual length lies between 1.9 cm and 2.0 cm.
Estimated length is 1.97 cm.
The doubtful digit is "7".



Actual width lies between 1.5 cm and 1.6 cm. Estimated width is 1.51 cm. The doubtful digit is "1".

Calculated Area
 $1.97 \times 1.51 = 2.9747$
 which rounds to 2.97
 (3 significant figures)

Area Range
 Actual area lies between 1.9×1.5 and 2.0×1.6
 $1.9 \times 1.5 = 2.85$
 $2.0 \times 1.6 = 3.2$
 so the actual area is between 2.85 and 3.2 cm²