**CHM 110**
**Accuracy and Precision Practice Set**
ANSWERS

**Determine the number of significant digits in each measurement.**

| | |
|---|:---:|
| <u>13.805</u> mg | **5** |
| <u>14</u>000 km | **2** |
| <u>2.70030</u> L | **6** |
| <u>4.0</u>x10$^{-3}$ mL | **2** |
| 0.00<u>760</u> ft | **3** |
| <u>705</u>0 cm$^2$ | **3** |
| <u>1500</u>. kg *(explicit decimal point!)* | **4** |
| <u>3.1420</u> in | **5** |
| 0.0000<u>77</u> m *(all are leading zeros!)* | **2** |
| <u>15</u>0 m$^2$/s | **2** |

**Write the answer of each calculation to the appropriate number of significant figures. Assume all numbers have uncertainty unless you are told otherwise.**

| | |
|---|---|
| $\dfrac{13.47\,\text{g}+3.14159\,\text{g}}{10.7\,\text{mL}}=$ | **1.55 g/mL** <br> *(Calculator shows 1.552485)* |
| $4.65\,\text{m}\times12.77\,\text{m}\times0.00456\,\text{m}=$ | **0.271 m³** <br> *(Calculator shows 0.270775)* |
| $130.788\,\text{g}-0.45\,\text{g}=$ | **130.34 g** <br> *(Calculator shows 130.338)* |
| $1.500\,in\times\dfrac{1\,ft}{12\,in}=$ <br><br> Assume $\dfrac{1\,ft}{12\,in}$ is exact. | **0.1250 ft** <br> *(Calculator shows 0.125)* |
| $12.7675\,\text{g}\times\dfrac{\text{mol}}{18.02\,\text{g}}=$ | **0.7085 mol** <br> *(Calculator shows 0.708518)* |

**Read the scale below to the correct number of significant figures.**
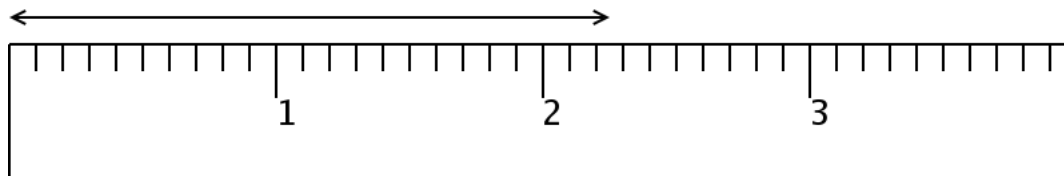


- **2.25** cm *(You may have estimated a different value for the last digit)*

**Answer the questions.**

Students Cliff and Sophia measure the mass of several samples of NaCl. Each NaCl sample actually weighs 5.00 grams. Each student measures their sample five times, and averages these weights to report their final answer. The measurements are listed below.

| *Cliff* | *Sophia* |
|---|---|
| 4.85 g | 4.64 g |
| 5.11 g | 4.67 g |
| 5.04 g | 4.60 g |
| 5.09 g | 4.61 g |
| 4.95 g | 4.63 g |

Cliff's average mass is 5.01g, and Sophia's average mass is 4.63g. Which student measured their mass with the greatest precision? Which student measured mass with the greatest accuracy? For the student with the poorest accuracy, suggest what could be done to improve their accuracy.

**Sophia's measurements are more precise, since there is less variation between each one of Sophia's measurements. Cliff's measurements are more accurate, since Cliff's final answer is closer to the true value of the mass of the NaCl samples than Sophia's is.**

**Sophia's measurements are all too low. This suggests that the balance that Sophia is using to make her measurements is not properly calibrated. Sophia should calibrate her balance and repeat the measurements, or repeat her measurements with a different balance that is known to be properly calibrated.**