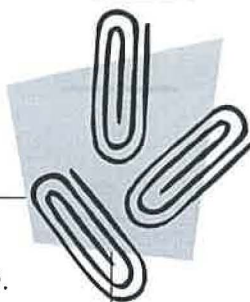


## And You Think You Have Significant Problems? Significant Figure Rules & Practice



### Important Ideas

- Measurements (3.25 cm) are different than numbers (3.14159252).
- Measurements consist of a number and units.
- Measurements are an action by someone with a measuring instrument.
- Measurements have built-in uncertainty; no measurement is exact.

### PAPER CLIP:

1. Estimate the length of the paperclip using each of the rulers given below...



length of paper clip  
4 cm



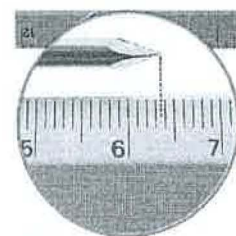
length of paper clip  
4.3 cm



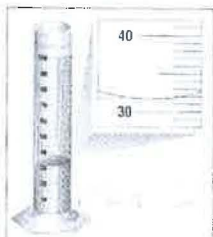
length of paper clip  
4.38 cm

### LENGTH:

1. In the picture at right, the scale on the ruler reads to the nearest teeth. This means that we can reasonably estimate to the thousandth place. Therefore, we might say that the length of this nail is 6.35 cm.



### VOLUME:



2. In the picture at left, the scale on the graduated cylinder reads to the nearest ones. This means that we can reasonably estimate to the tenths place. Therefore, we might say that the volume of water shown here is 31.9 mL.

### Significant Figure Rules

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. When we MULTIPLY/DIVIDE, your answer is rounded to the fewer number of \_\_\_\_\_
6. OPTIONAL: When we ADD/SUBTRACT, your answer is rounded to the smallest \_\_\_\_\_

**PRACTICE PROBLEMS:**

**I. Determine the number of significant figures in each measurement.**

- |                          |                         |                           |  |                           |
|--------------------------|-------------------------|---------------------------|--|---------------------------|
| 1.) $\frac{6.751}{4}$ g  | 4.) $\frac{2500}{2}$ m  | 7.) $\frac{0.106}{3}$ cm  | 10.) $\frac{26.509}{5}$ g              | 13.) $\frac{2.690}{4}$ g  |
| 2.) $\frac{0.157}{3}$ kg | 5.) $\frac{700.}{3}$ g  | 8.) $\frac{0.0067}{2}$ g  | 11.) $\frac{54.52}{4}$ cm <sup>3</sup> | 14.) $\frac{43.07}{4}$ cm |
| 3.) $\frac{28.0}{3}$ nm  | 6.) $\frac{30.07}{4}$ g | 9.) $\frac{0.0230}{3}$ cm | 12.) $\frac{0.1209}{4}$ m              | 15.) $\frac{635200}{7}$ g |

**II. Multiply/Divide the following, and write your answer with the correct number of significant figures. PLEASE BE CAREFUL ABOUT YOUR UNITS!!!**

**RULE:** When we multiply/divide, your answer is rounded to the fewer # of sig figs.

- |   |   |
|---|---|
| 16.) 2.6 cm x 3.78 cm<br>$9.828 \rightarrow 9.8 \text{ cm}^2$           | 20.) 35 cm <sup>2</sup> ÷ 0.62 cm<br>$56.4516 \rightarrow 56 \text{ cm}$        |
| 17.) 6.54 m x 0.37 m<br>$2.4198 \rightarrow 2.4 \text{ m}^2$            | 21.) 39 g ÷ 24.2 g<br>$1.6116 \rightarrow 1.6$                                  |
| 18.) 0.036 m x 0.0002 m<br>$0.0000072 \rightarrow 0.000007 \text{ m}^2$ | 22.) 0.58 dm <sup>3</sup> ÷ 2.15 dm<br>$0.02397 \rightarrow 0.024 \text{ dm}^2$ |
| 19.) 3.08 km x 5.2 km<br>$16.016 \rightarrow 16 \text{ km}^2$           | 23.) 40.8 m <sup>2</sup> ÷ 5.050 m<br>$8.0792 \rightarrow 8.08 \text{ m}$       |

*Part 3 is OPTIONAL. If you want to earn a "10" for the standard then you will need to learn and practice this concept.*

**III. Add/Subtract the following, and write your answer with the correct number of significant figures. DON'T FORGET ABOUT UNITS!!!!**

**RULE:** When we add/subtract, your answer is rounded to smallest \_\_\_\_\_ place.

- |   |  |
|---|--|
| 24.) 16.5 cm + 8 cm + 4.37 cm<br>$28.87 \rightarrow 29 \text{ cm}$  | 28.) 23.27 km - 12.058 km<br>$11.212 \rightarrow 11.21 \text{ km}$ |
| 25.) $\overset{10^{-1}}{13.25} \text{ g} + \overset{10^{-1}}{10.00} \text{ g} + \overset{10^{-1}}{9.6} \text{ g}$<br>$32.85 \rightarrow 32.3 \text{ g}$ | 29.) 13.57 g - 6.3 g<br>$7.27 \rightarrow 7.3 \text{ g}$           |
| 26.) 2.36 m + 3.38 m + 0.355 m + 1.06 m<br>$7.155 \rightarrow 7.16 \text{ m}$   | 30.) 350.0 m - 200 m<br>$150.0 \rightarrow 200 \text{ m}$          |
| 27.) 0.0853 g + 0.0547 g + 0.037 g + 0.00387 g<br>$0.18087 \rightarrow 0.181 \text{ g}$   | 31.) 27.68 cm - 14.369 cm<br>$13.311 \rightarrow 13.31 \text{ cm}$ |