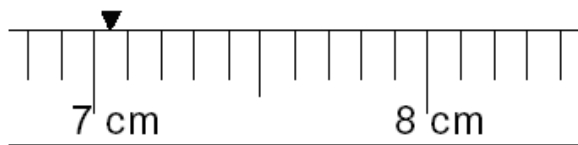
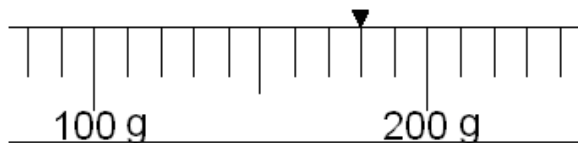


**Pre-lab Exercise KEY for Measurement**

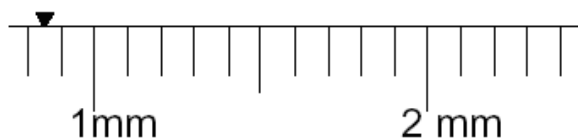
Read the scales below. All measurements must have: quantity  $\pm$  measurement uncertainty & units.



At least 7.0 cm... will estimate in the hundredths place:  
 $7.04 \pm 0.01$  cm



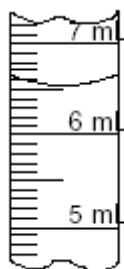
At least 180 g... will estimate the ones place:  
 $180. \pm 1$  g



At least 0.8 mm... will estimate hundredths place:  
 $0.84 \pm 0.01$  mm

On the graduated cylinders below, use an "x" to mark the point on the meniscus where the volume is read. Also, determine the increment (smallest subdivision) for each graduated cylinder.

1 mL / 10 spaces  $\rightarrow$   
 Increment = 0.1 mL



"X" should be at the lowest point of the meniscus.

5 mL / 10 spaces  $\rightarrow$



Increment = 0.5 mL

Often in lab, you do not directly measure the mass of a sample, and instead you calculate the mass by subtraction. Based on the following data, calculate the mass of sample liquid:

Mass of empty graduated cylinder \_\_\_\_\_ 12.3448 g \_\_\_\_\_

Mass of grad. cylinder and 5.00 mL sample liquid \_\_\_\_\_ 18.6637 g \_\_\_\_\_

Mass of 5.00 mL sample liquid \_\_\_\_\_ **6.3189 g** \_\_\_\_\_

What is the density of the sample liquid?

$6.3189 \text{ g} / 5.00 \text{ mL} = 1.26 \text{ g/mL}$