

Measurement

Today we will be focusing on measurement and uncertainty. You will be measuring the three sides of two different triangles and comparing the lengths you find to the ones predicted by the pythagorian theorem. Later you will be measuring the volume of a sphere of clay using two methods and comparing the results.

Triangles:

Using the ruler provided measure the lengths of the three sides (A, B, C) of the large triangle at your table. Report the sizes with uncertainty using both absolute uncertainty and relative uncertainty. When estimating your uncertainty have each member of your lab group make at least two measurements of each side and be clear what was the primary source of uncertainty in your measurement.



Now use the Pythagorean theorem to predict the size of C (C_{th}) from the values you measured for A and B, show your work.



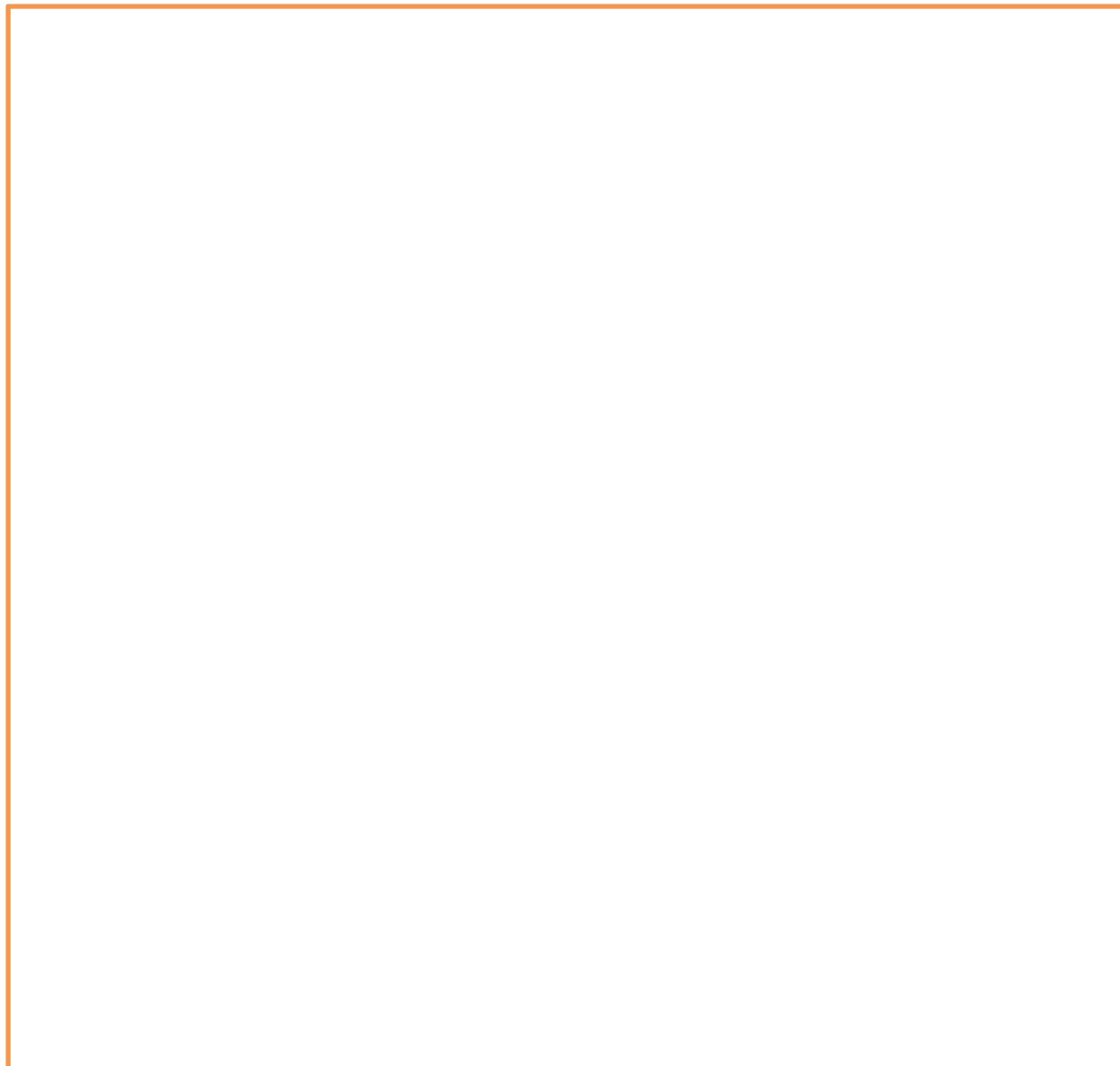
Use propagation of error to calculate the uncertainty in C_{th} , show your work.



Are your results from direct measurement consistent with the results from the Pythagorean theorem?
Explain your reasoning.



Repeat the above steps for the sides of the small triangle (a, b, c) (measure, calculate, propagate error, and compare). Explain what the new source of error is.



Spheres.

Make a good sphere from one of the balls of clay. Using the calipers measure the diameter of the sphere and use it to calculate the volume of the sphere. Be sure to explain how you found the uncertainty in the diameter, radius, and volume of the sphere.



Measure the volume of the sphere by some other method of your own devising. Describe how you did it and compare it to the result using the method above and explain whether they are consistent or not.

