LAB–The Pythagorean Theorem and Classifying Triangles   Name _____

In the Pythagorean Theorem, which letter symbolizes the longest side of the triangle? ___

PROCEDURE:
On the calculator, you will create a triangle. You will use its side lengths and angle measures to learn something new about the Pythagorean Theorem.

1.   Choose the **Triangle** tool ([F2] menu, WINDOW button) to draw a triangle by pressing ENTER in three places.

2.   Choose the **Distance & Length** tool in the Measure submenu ([F5] menu, GRAPH button) to measure the three sides of the triangle. To measure a side, press ENTER on each endpoint of the segment.
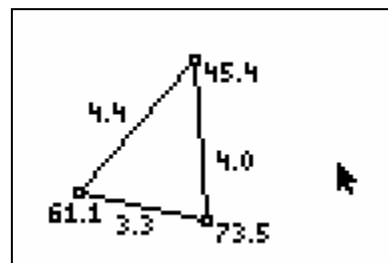
3.   Choose the **Angle Measure** tool ([F5] menu, GRAPH button) and measure the 3 interior angles of the triangle. To measure an angle, press ENTER on 3 points, with the vertex of the angle 2nd.

4.   Classify the triangle as an acute, obtuse, or right triangle. Fill in the lengths of the sides in the first row of the chart on the next page. Make sure that the longest side length is put in the column labeled _____.

5.   Use the **Calculate** tool ([F5] menu, GRAPH button) to find the value of $a^2 + b^2$.
   - Press ENTER on the side length for a, then press ✕, then press ENTER on the side length for a. This creates a value for a^2.
   - Press ENTER on the side length for b, then press ✕, then press ENTER on the side length for b. This creates a value for b^2.
   - Press ENTER on the value for a^2, then press +, then press ENTER on the side length for b^2. This is the final value for $a^2 + b^2$. Fill it in the first row of the chart.

6.   Use the **Calculate** tool ([F5] menu, GRAPH button) to find the value of c^2.
   - Press ENTER on the side length for c, then press ✕, then press ENTER on the side length for c. This creates a value for c^2. Fill it in the first row of the chart.

7.   Now that the first row of the chart is filled in, use the **Hand Cursor** tool (ALPHA button) to drag one vertex of the triangle to change its shape. Fill in the chart for the new triangle. Make sure to create some triangles of each type (acute, obtuse and right) and complete the chart.

<u>COLLECT DATA</u>:

TYPE of TRIANGLE	A	B	C	A^2 + B^2	C^2

<u>MAKE CONJECTURES</u>:

8.   Do the right triangles confirm the Pythagorean Theorem? (Does $a^2 + b^2 = c^2$ for your right triangles?)

9.   What do you notice about the triangles where $a^2 + b^2 < c^2$?

10.   What do you notice about the triangles where $a^2 + b^2 > c^2$?

<u>APPLY THE MATH</u>:

11.   Predict which type of triangle each will be (acute, right, obtuse).

   A.   6, 8, 10 _____

   B.   6, 8, 11 _____

   C.   9, 10, 11_____

   D.   9, 12, 14 _____

   E.   9, 12, 15 _____

   F.   4, 7, 10 _____

12.   Create a set of sides that would make an acute triangle. _____

13.   Create a set of sides that would make an obtuse triangle. _____