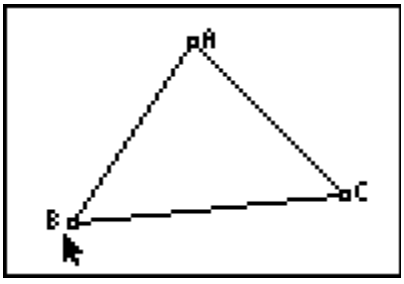
Name _____

Class _____

Problem 1 – Investigation of 45°-45°-90° Triangles

First, turn on your TI-84 and press APPS. Arrow down until you see **Cabri Jr** and press ENTER. Open the file **ISOSC**. This file has a triangle with an isosceles triangle with *AB* = *AC*.



Using the **Perpendicular** tool (ZOOM > **Perp.**), construct a perpendicular from point *A* to side *BC*. Label the point of intersection of this line with *BC* as *D*. To name the point, they need to select the **Alph-Num** tool (GRAPH **> Alph-Num**), select the point, and press x^{-1} ENTER for the letter D.

Construct line segments *BD* and *CD* (WINDOW > **Segment**) and then measure the segments (GRAPH > **Measure** > **D. & Length**).

BD = _____ *CD* = _____

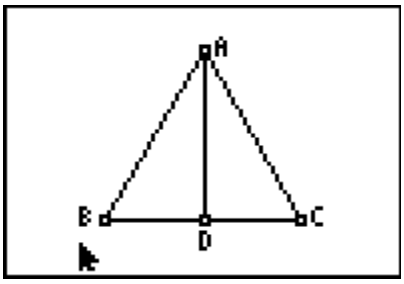
Would you have expected these segments to be equal in length?

Drag point *C* to see the effect on the lengths of the line segments. It appears that the perpendicular from the vertex always bisects the opposite side. Measure the angles *BAD* and *CAD*.

∠*BAD* = _____ ∠*CAD* = _____

Will they always be equal? _____

Problem 2 – Investigation of 30°-60°-90° Triangles



Open the file **EQUIL**. Note that all three angles are 60° angles.

Construct the perpendicular from *A* to side *BC*. Label the point of intersection as *D*.

From the construction above, we know that *D* bisects *BC* and that $m\angle BAD = 30°$.

Construct segment *BD*. We now have triangle *BAD* where $m\angle D = 90°$, $m\angle B = 60°$ and $m\angle A = 30°$. We also have triangle *ACD* where $m\angle A = 30°$, $m\angle C = 60°$ and $m\angle D = 90°$.

This completes the construction of two 30°-60°-90° triangles. We will work only with the triangle BAD.

Measure the three sides of triangle BAD.

AB = _____ BD = _____ AD = _____

Press GRAPH and select the **Calculate** tool. Click on the length of *BD*, then on the length of *AB*. Press the ÷ key. Move it to the upper corner. Repeat this step to find the ratio of *AD*:*AB* and *AD*:*BD*. These ratios will become important when you start working with trigonometry.

BD:*AB* = _____ *AD*:*AB* = _____ *AD*:*BD* = _____

Drag point *C* to another location.

What do you notice about the three ratios?

_____

Problem 3 – Investigation of 45°-45°-90° Triangles

Press the Y= button and select **New** to open a new document.

To begin the construction of the 45°-45°-90° triangle, construct line segment *AB* and a perpendicular to *AB* at *A*.

Use the compass tool with center *A* and radius *AB*. The circle will intersect the perpendicular line at *C*.

Hide the circle and construct segments *AC* and *BC*.

Explain why *AB* = *AC* and why angle *ACB* = angle *ABC*?

Why are these two angles 45° each?

Measure the sides of the triangle.

AC = _____ BC = _____ AB = _____

Use the **Calculate** tool to find the ratio of *AC:BC* and *AC:AB*. Once again, these ratios will be important when you study trigonometry

Drag point *B* and observe what happens to the sides and ratios.

Why do the ratios remain constant while the sides change?