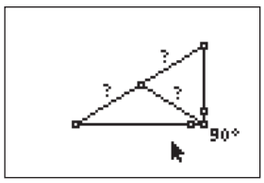
Investigating Segments in a Right Triangle

Approximate Total Time: 20 minutes

ACTIVITY OVERVIEW:

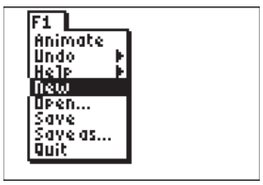
In this activity we will

- Draw a right triangle
- Find the midpoint of the hypotenuse
- Measure the distances from the midpoint of the hypotenuse to each vertex
- Make a conjecture about these distances



In this activity, we will review definitions of terms such as *right triangle*, *hypotenuse*, *midpoint*, *vertices*, and *equidistant*. We will then discover an important characteristic of the midpoint of the hypotenuse.

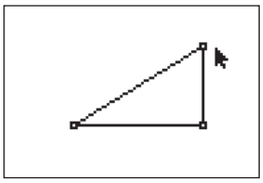
NCTM Geometry Standard: Analyze characteristics and properties of 2- and 3-dimensional geometric shapes and develop mathematical arguments about geometric relationships.



1

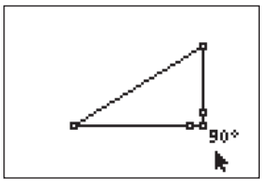
Press APPS. Move down to the CabriJr APP and press ENTER. Press ENTER, or any key, to begin using the application.

Press Y= for the F1 menu and select **New**. (If asked to **Save changes?** press ◄ ENTER to choose "No.")



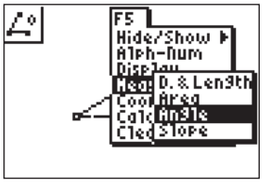
2

Press WINDOW for F2, move down to **Triangle** and press ENTER. Press ENTER to mark the first vertex of a triangle. Move the cursor several times to the right and press ENTER to mark the second vertex. Move the cursor straight up several times and press ENTER to mark the third vertex of the triangle.



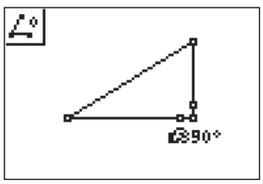
3

Since the triangle was drawn using only moves to the right and up, it should be a right triangle. This can be supported by using the angle measuring tool in the F5 menu as shown in the next steps.



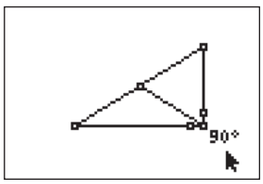
4

Press GRAPH for the F5 menu, move down to **Measure**. Move right and down to **Angle** and press ENTER. To measure an angle you will select three points. As in naming an angle, the second point will be the vertex of the angle. Each of the other two points can be a vertex or any point on the side of the side of the triangle.



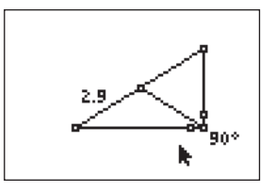
5

Move the pencil until a side of the triangle is flashing, then press ENTER to mark a point on the side. Move the pencil until the vertex of the angle to be measured is flashing. Press ENTER. Move the pencil until a second side is flashing. Press ENTER to mark the third point naming the angle. The measurement of the interior angle is displayed and the pointer changes to a *hand*. Use the arrow keys to move the measurement to a convenient location. Press CLEAR to deactivate the *hand*.



6

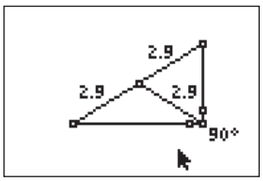
Press ZOOM for the F3 menu, move down to **Midpoint** and press ENTER. Move the arrow until the hypotenuse is flashing and press ENTER. Press WINDOW for the F2 menu, move down to **Segment** and press ENTER. Move the pencil until the midpoint of the hypotenuse is flashing and press ENTER. Move until the vertex point of the right angle is flashing and press ENTER.



7

Next we measure the lengths of the segments drawn from the midpoint of the hypotenuse to each vertex. Press GRAPH for the F5 menu and move down to **Measure** and right to **D. & Length**. Press ENTER. Move to one endpoint of the hypotenuse and press ENTER. Move to the midpoint of the hypotenuse and press ENTER. Move the measurement to a convenient location.

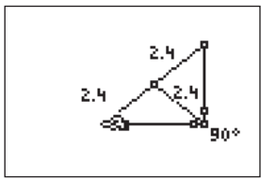
Investigating Segments in a Right Triangle



8

The **Measurement** tool is still active, so repeat the process above until you have the measurements for the other two segments (from the midpoint to a vertex).

Based on the measurements, what appears to be true about the distance from the midpoint of the hypotenuse of a right to each of the vertices?



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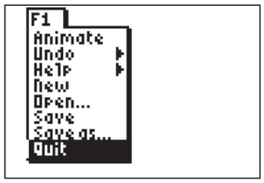
The midpoint of the hypotenuse of a right triangle is equidistant from the vertices of the triangle.

Test this conjecture by moving the vertices at the acute angles to change the lengths of the sides of the triangles. (Be careful not to change the right angle.)



10

To exit the APP, press [Y=] for the F1 menu. Move to **Quit**, then press [ENTER]. (Or you can press [2nd] [MODE] for [QUIT].)