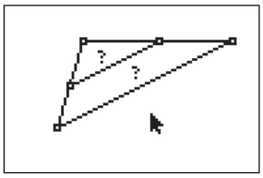
Investigating Segments in a Triangle

Approximate Total Time: 25 minutes

ACTIVITY OVERVIEW:

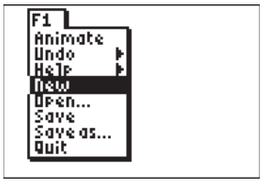
In this activity we will

- Draw a triangle
- Find the midpoints of two sides
- Draw a segment to join the midpoints
- Explore the relationships between the segment and the third side of the triangle—their lengths and the slopes of the lines containing the segments



In the previous activity, we investigated the *midsegments* of a triangle. We will continue exploring these segments and extend our understanding of the relationships that exist by examining the *slopes* of lines containing the segments.

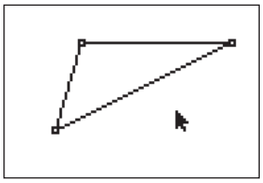
NCTM Geometry Standard: Analyze characteristics and properties of 2- and 3-dimensional geometric shapes and develop mathematical arguments about geometric relationships.



1

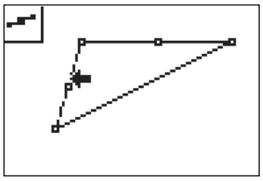
Press APPS. Move down to the CabriJr APP and press ENTER. Press ENTER, or any key, to begin using the application.

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



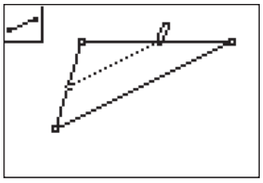
2

Press WINDOW for F2, move down to **Triangle** and press ENTER. Move to the location of a vertex and press ENTER. Move to the second vertex and press ENTER. Move to the third vertex and press ENTER. Press CLEAR to exit the triangle drawing tool.



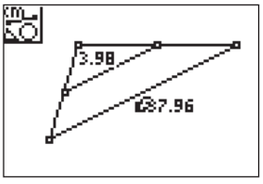
3

Press ZOOM for the F3 menu, move down to **Midpoint** and press ENTER. Move the arrow until a side of the triangle is flashing and press ENTER. Move until another side of the triangle is flashing and press ENTER.



4

To draw the segment joining the two midpoints, press WINDOW for F2, move to **Segment** and press ENTER. Move the pencil until one midpoint is flashing and press ENTER. Move the pencil until the other midpoint is flashing and press ENTER. How does the length of the segment joining the midpoints of two sides of a triangle compare to the length of the third side?



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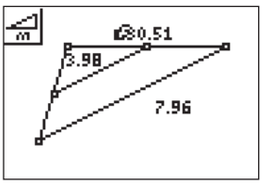
Press GRAPH for the F5 menu to measure the length of the segment joining the two midpoints. Move down to **Measure** and right to **D & Length**. Press ENTER. Move the arrow until the segment joining the midpoints is flashing. Press ENTER. Press + to see the measurement rounded to hundredths. Move the measurement to a convenient location. Press CLEAR to turn off the *hand*. With the measurement tool still active, find the measure of the third side of the triangle. Press CLEAR to exit the measurement tool.



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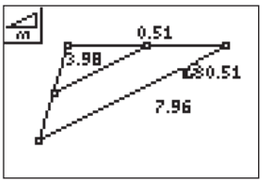
How does the slope of the line containing the segment joining the midpoints compare to the slope of the third side?

Press GRAPH for F5 and move to **Measure** then right and down to **Slope**. Press ENTER. Move the arrow until the segment joining the midpoints is flashing. Press ENTER then + to view it rounded to hundredths. Move the measurement to a convenient location then press CLEAR to turn off the *hand*.



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With the **Slope** tool still active, move to the third side of the triangle. Press ENTER when the side is flashing. Press + to view the measurement rounded to hundredths. Move the measurement to a convenient location then press CLEAR to turn off the *hand*. Press CLEAR again to turn off the **Slope** tool.

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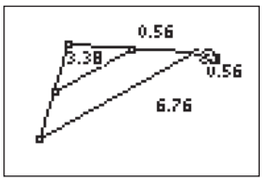

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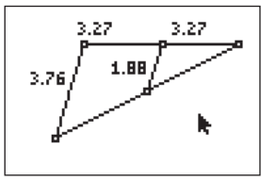
"The segment joining the midpoints of two sides of a triangle is parallel to the third side and has measure equal to one-half the measure of the third side."

Test this conjecture on other triangles by moving to a vertex, pressing [ALPHA], changing the position of the vertex, and observing the changes in the slopes and measurements of the segments.



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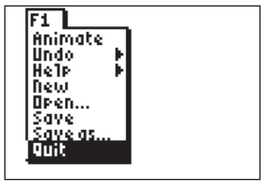
Further test these conjectures using different sides of the triangle.



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