Medians in a Triangle

ID: 9690

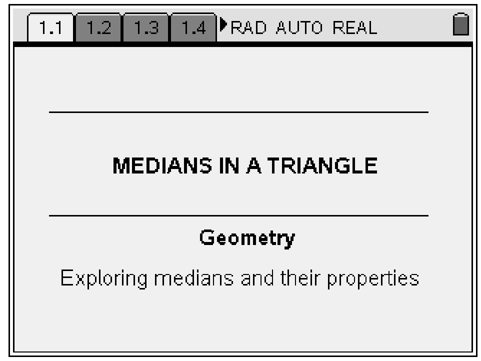
Name ______________________

Class ______________________

In this activity, you will explore:

- *medians*
- *centroids*
- *coordinates of centroids*

Open the file *GeoAct32_MedianTriangle_EN.tns* on your handheld and follow along with your teacher to work through the activity. Use this document as a reference and to record your answers.

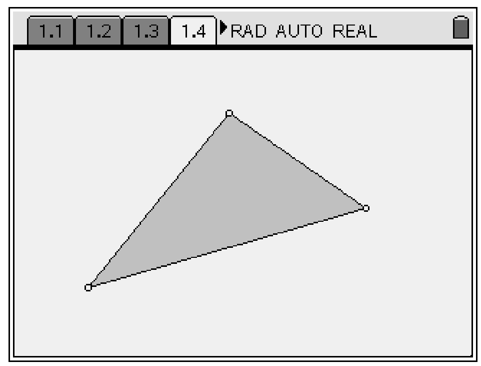


Problem 1 – Medians and concurrency

A **median** of a triangle connects a vertex of the triangle with the midpoint of the opposite side.

On page 1.4, construct all three medians using the **Midpoint** and **Segment** tools. Drag the vertices and observe what happens to the medians.

- What do you notice about the third median with respect to the other two?

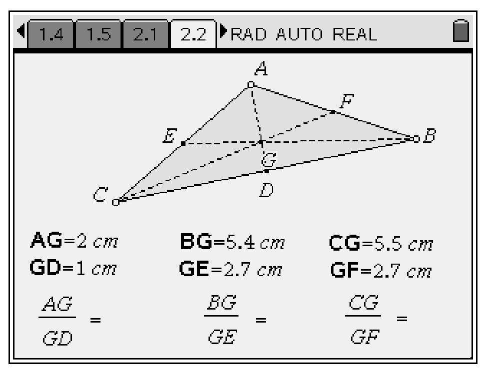


Problem 2 – Parts of a median

The point of concurrency of the three medians of a triangle is called the centroid. In the triangle on page 2.2, point *G* is the centroid. The lengths of the "parts" of each median are displayed.

Use the **Calculate** tool to evaluate the ratios. Then drag the vertices.

- How does the centroid of a triangle divide each median?



The spreadsheet on page 2.5 captured the lengths *AG* and *GD* as you dragged the vertices on page 2.2. Select Columns A and B and make a **Quick Graph** of the data. Then fit a movable line to the data points.

- What is the slope of the fit line? What is the significance of this slope?

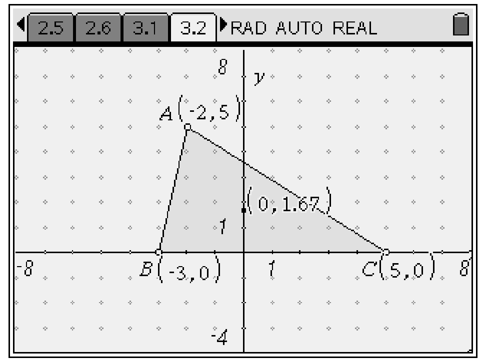
Problem 3 – Coordinates of the centroid

On page 3.2, a triangle and its centroid is shown on a coordinate grid.

Look at the *x*-coordinates of the vertices and try to find how they are related to the *x*-coordinate of the centroid. Do the same for the *y*-coordinates of the vertices and the *y*-coordinate of the centroid.

Then drag vertices to test your conjecture.

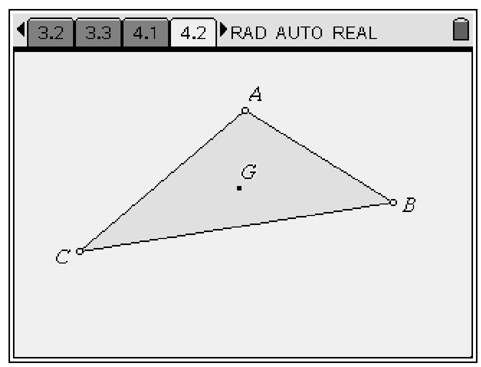
- What is the relationship between the coordinates of the vertices of a triangle and the coordinates of the centroid?



Problem 4 – Area relationships

The centroid of a triangle is also its center of gravity (or mass), provided the triangle has a uniform thickness and density.

- On page 4.2, verify this by drawing △*AGC*, △*AGB*, and △*BGC*, and measuring their areas. Then change the size of the triangle. What do you notice?



Take this exploration one step further:

- On page 4.4, draw and measure the areas of each of the 6 small triangles formed by the 3 medians. Then drag the vertices. What do you observe?