4F: Exploring Midsegments with G.S.P.

In this activity, we will use Geometer’s Sketchpad to discover some useful properties of triangle midsegments.

**Definition: Midsegment –** A segment that connects two *midpoints* in a polygon.

Follow the steps below and write a response to the questions as you go.

**Construction 1: Length of the midsegment**

1. Construct $ΔABC$.
2. Construct the midpoint of side $\overbar{AB}$ and label it point $M$by selecting the line and choosing [midpoint] from the [construct] menu.
3. Construct the midpoint of side $\overbar{BC}$ and label it point $N$
4. Now construct the midsegment $\overbar{MN}$.
5. Measure the length of the midsegment $\overbar{MN}$ by selecting the segment and going to [Measure], [Length].
6. Measure the length of side $\overbar{AC}$.
7. Now select [Number], [Calculate] and type “2\*” then click on $m\overbar{MN}$ which is on the main screen.
8. Move points $A, B,$ and $C$ and observe these measurements.
*How does the length of midsegment compare to the length of the opposite side (*$\overbar{AC}$*)?*

**Position of the midsegment**Continue with the same drawing and do the following steps.

1. Click on $\overbar{MN}$ and choose [Measure], [Slope].
2. Now do the same to measure the slope of $\overbar{BC}$.
3. Move points $A, B,$ and $C$ and observe these slopes.
How does the slopes compare?
*What does this tell you about the midsegment and the opposite side (*$\overbar{AC}$*)?*

|  |
| --- |
| ***Triangle Midsegment Theorem:*** The midsegment of a triangle is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to the opposite side and it is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of it’s length. |

**Extra: Midsegment Triangles**Continue with the same drawing and do the following steps.

1. Construct the other two midsegments in the triangle.
2. The three midsegments of the triangle make a new triangle.
 *How does this triangle compare to the original triangle?*
3. Click on points $A, B, $and$ C$and choose [Construct], [Triangle interior].
4. Select the shaded area and choose [Measure], [Area].
5. Repeat these two steps to find the area of the triangle made by the midsegments.
*How do these two areas compare?*