Name:_____ Date:_____ Score:_____

Geometry(+): Mrs. Carl

Construction 24: Similar Triangles

Objective: To use a dynamic computer based geometry program to construct to similar triangles and measure, record and compare all angles and sides.

Instructions:
There are many dynamic (moving) computer-based geometry programs available for us to use. For the purposes of the this assignment I will be using Geogebra, freely available at http://www.geogebra.org/cms/en/download/.

Creating & Measuring Polygons
1. Draw any triangle using the polygon tool at the top of the screen. Record the length of each side below
2. Use the angle tool to measure the angles at each vertex. Record each angle below.

a =_____   ∠A = _____

b= _____   ∠B = _____

c= _____   ∠C = _____

3. **Using the Input Bar**
   a. Find the midpoint of $\overline{AC}$ by typing **Midpoint[A,C]** in the input bar. Find the midpoint of all three sides of the triangle.
   b. Connect all three midpoints with whatever tool you like. What shape is formed? _____
   c. How is the new shape related the the original triangle? Explain.

   _____

   _____

   _____

   d. Find the perimeter of $\triangle ABC$ by entering **Perimeter[poly1]** in the input bar. $Perimeter$ =_____.
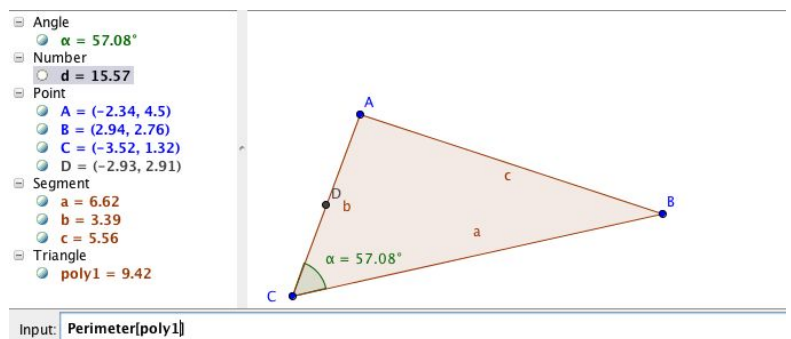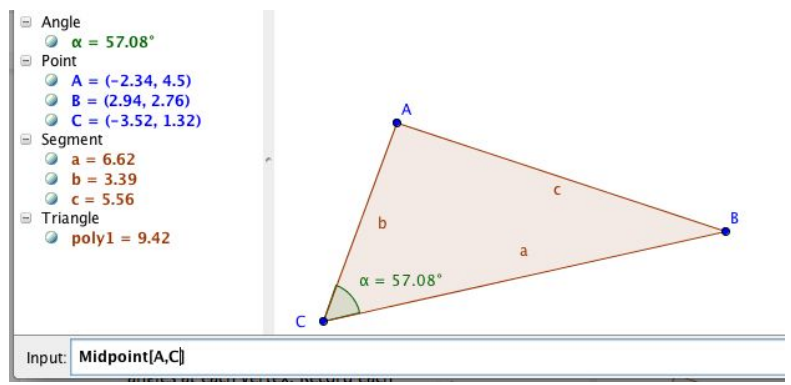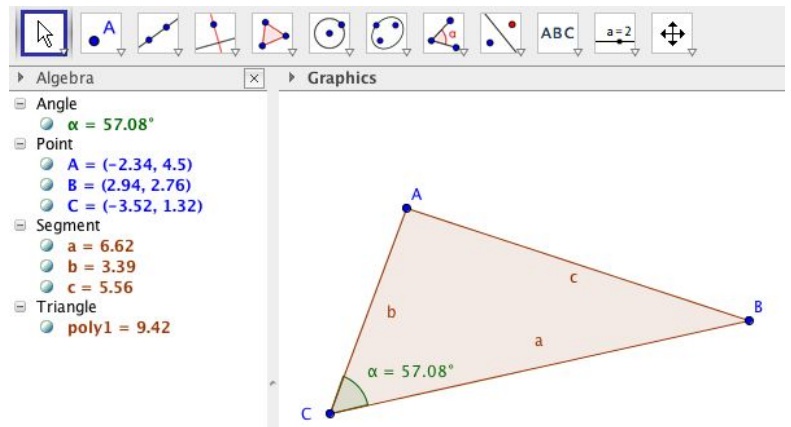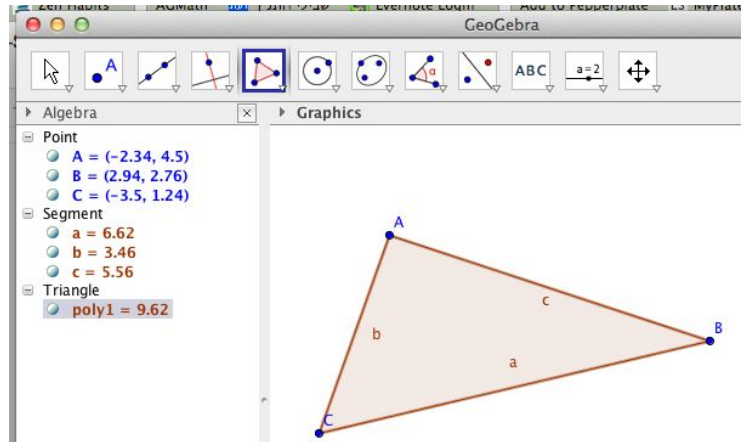
Proving Triangles Similar

AA Postulate: *If two triangles have exactly two pairs of corresponding angles that are congruent, then the triangles are similar.*

SAS Similarity Theorem: *If two triangle have two pairs of proportional sides and the included angles are congruent then the triangles are similar.*

Objective: Prove that $\triangle ABC$ and the triangle formed by its midlines [segments connecting the midpoints arallel liofesasbesidel tariangle similar.quadrilaterals?]

Example:

Given : $\overline{DF}, \overline{ED}$ and $\overline{FE}$ are midlines.
Prove : $\triangle ABC \sim \triangle EDF$
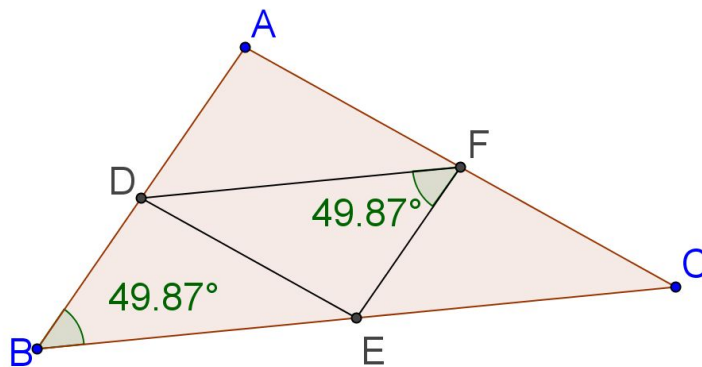
1. Use the input bar to calculate the scale factor between $\triangle ABC$ and $\triangle EDF$. Prove that it will always be two.

   _____

   _____

   _____

2. Draw the triangle formed by the midpoints of the $\triangle EDF$. What is the scale ratio of the new triangle to the original triangle $\triangle ABC$? Explain:

   _____

   _____

   _____

   _____

3. **(Extra Credit)** Given the pattern in questions 1 & 2, write an equation to describe the scale factor for the 5th , 21st and n^{th} inset triangle.

   _____