Trapezoids Investigation   Name_____

Definition: **A TRAPEZOID is a quadrilateral with exactly one pair of parallel sides.**

Use GeoGebra to **construct a quadrilateral that is a TRAPEZOID**. *Make sure that this quadrilateral stays a trapezoid when you drag any one or more of its vertices around!!!*

Be sure to label its vertices *A*, *B*, *C*, and *D*. (Label them consecutively—that is, going in a counterclockwise or clockwise orientation.) **Also, make sure to label the four vertices of your trapezoid so that $\overline{DC}$ and $\overline{AB}$ are parallel segments.**

Also, be sure to hide everything else you may have constructed to construct this trapezoid afterwards.

For this **trapezoid**, use GeoGebra to do the following:

1)   Measure and display the lengths of its two parallel sides (called bases).

2)   Plot and label the midpoint of $\overline{AD}$ as *E*.

3)   Plot and label the midpoint of $\overline{CB}$ as *F.*

4)   Construct segment $\overline{EF}$. *Note: This segment $\overline{EF}$ is called a* **median** *of trapezoid ABCD***.**

5)   Use GSP to find the slopes of the segments $\overline{EF}$, $\overline{AB}$, and $\overline{DC}$.

6)   *Drag one or more vertex/vertices of this trapezoid around. What do you notice about these 3 slopes?*

7)   *What does your observation in step (6) imply about the median of a trapezoid?*

8)   Now Measure and display the length of $\overline{EF}$. Drag this measurement next to the actual segement $\overline{EF}$ on your computer screen.

9)   Now, highlight the **Input** bar. In this input bar, find the average of the base lengths. (Be sure to input these sides using their names (variable letters) and not as fixed numerical values.

10)   Move the vertices of trapezoid *ABCD* around. *Do you notice anything interesting? If so, what is it?*

11) Use your observations from steps (1) – (10) to complete the following theorem:

The _____ **of a trapezoid is**

a) _____ **to both of its bases**   **AND**

b) **has a length equal to the** _____ **of its** _____ **lengths.**

12) Use your conclusions to answer the following questions: