

## Geometry Discovery using Geogebra

Topic: Trisecting a dynamic segment using the tool bar of Geogebra.

Goal:

1. To understand the concepts required to trisect a segment.
2. To improve your Geogebra skills: tools and syntax

Explorations 1 and 2 will use Geogebra. Exploration 3 will use your compass and straightedge.

Exploration1:

1. Draw a free moving(dynamic) segment  $\overline{AB}$  and then find it's midpoint C.
2. Construct  $\overline{AC}$  and  $\overline{CB}$ .
3. Find midpoint D of  $\overline{AC}$  and midpoint E of  $\overline{CB}$ .

Q1: what have you done to  $\overline{AB}$ ?

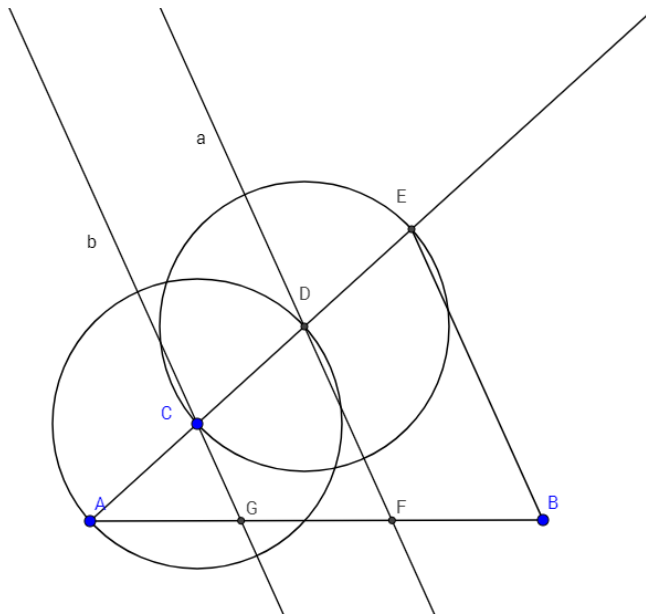
Q2: Is there any way to take this method and accomplish your goal? ((I can think of one way – kind of cheating)



Exploration 2: (more traditional:Euclid's method)

1. Draw a dynamic segment  $\overline{AB}$ .
2. Construct  $\overrightarrow{AC}$
3. Construct circle centered at C with radius AC.
4. Construct intersection of circle C and  $\overrightarrow{AC}$ , call it D.
5. Construct circle centered at D with radius AC.
6. Construct intersection of circle D and  $\overrightarrow{AC}$ , call it E.
7. Construct  $\overline{EB}$ .
8. Construct line through D  $\parallel \overline{EB}$ , call it a
9. Construct intersection of a and  $\overline{AB}$ , call it F.
10. Construct line through C  $\parallel \overline{EB}$ , call it b.
11. Construct intersection of b and  $\overline{AB}$ , call it G.
12. Measure AG, GF, and FB.
13. Test trisection by moving points A or B.

Q3: Why do you think this works? Feel free to use your own words and throw in some geometry words too 😊 – remember: repeating the steps back to me is not a valid reason!



Exploration 3:

Use the space below and your compass and straightedge to complete the steps in Exploration 2.

Q4: What advantages and/or disadvantages did you observe doing the same problem the two different ways?