

Rectangle Investigation

Name _____

Use this GeoGebra applet to help you complete the following investigation. **BE SURE to move the vertices and sides of this rectangle around after completing each step in order to help you make more informed conjectures:**

- 1) Measure and display the lengths of all 4 sides. What, if anything, do you notice?

- 2) Construct the midpoint of \overline{AC} (even though you haven't constructed \overline{AC} yet.) Label this point "E".

- 3) Construct segments with lengths AE , BE , CE , & DE . Then measure and display their lengths. What do you notice? Describe in detail.

- 4) Measure & display the measures of the 12 angles you now see.

- 5) Construct polygon (triangle) ABC . Then reflect this polygon about \overline{AC} . What do you notice?

- 6) Use GeoGebra to "UNDO" BOTH ACTIONS in step (5).

- 7) Now construct polygon (triangle) DBA . Then reflect this polygon about diagonal \overline{DB} . What do you notice?

OVER➔

8) Use your observations in this investigation to answer the following questions:

Are opposite sides of a rectangle congruent?

Are opposite angles (ENTIRE ANGLES—like angle DAB & angle DCB) of a rectangle congruent?

Do the diagonals of a rectangle bisect EACH OTHER?

Does a diagonal of a rectangle bisect a pair of opposite angles?
If so, how many diagonals do this?

Are the diagonals of a rectangle perpendicular?

Are the diagonals of a rectangle congruent?

Does either diagonal of a rectangle serve as a line of symmetry?
If so, how many?

Is a rectangle a parallelogram? If so, WHY is it a parallelogram?
(Provide at least 3 reasons to verify your answer.)