Name _____

Date _____

EXPLORATIONS

Activity 11

Midsegment of a Trapezoid

Construct the geometric object by following the instructions below, and then answer the questions about the object.

1. Create a trapezoid.
   a. Create a segment and label it $\overline{AB}$.
   b. Create a point not on segment $\overline{AB}$ and label it C.
   c. Create a line parallel to $\overline{AB}$ through point C.
   d. Create point D on the line containing C as shown below.

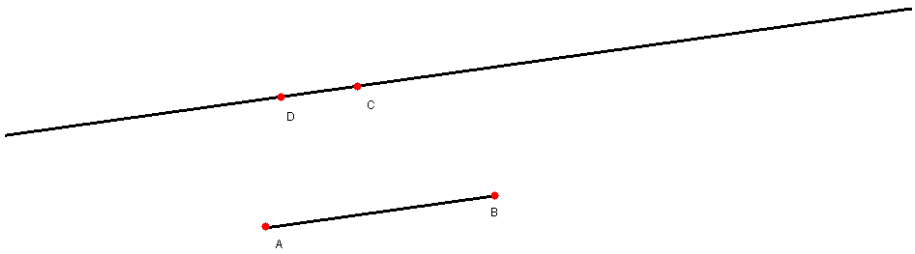

Figure 11.1

2. From the Draw Toolbar, select **Hide/Show**.
3. Move the pencil to line $\overline{CD}$ until the message ***This line*** appears and click. A dotted line appears until you complete the next step.
4. From the Lines Toolbar, select **Segment**.
5. Create segments $\overline{CD}$, $\overline{BC}$ and $\overline{AD}$.
6. Drag point A so that $\overline{AD}$ and $\overline{BC}$ are not parallel. You have created a *trapezoid*, which is a quadrilateral with exactly one pair of opposite sides parallel.
7. Construct the midsegment of a trapezoid.
   a. From the Construct Toolbar, select **Midpoint**.

b. To construct the midpoint, click on $\overline{AD}$ when the message ***Midpoint of this segment*** appears.

c. Label this point E.

d. Construct the midpoint of $\overline{BC}$ and label it F.

e. Create segment $\overline{EF}$. This is the *midsegment* of a trapezoid.

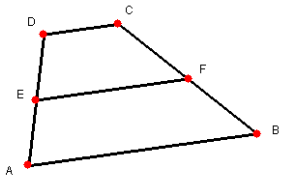

Figure 11.2

8. From the Check Property Toolbar, select **Parallel**.

9. Move the cursor toward segment $\overline{EF}$ until the message ***Is this segment*** appears. Click once.

10. Move the cursor toward segment $\overline{AB}$ until the message ***Parallel to this segment*** appears. Click once.

11. Drag the dotted box to the upper right corner and click.

12. Are the two segments parallel?

_____

13. From the Check Property Toolbar, select **Parallel**.

14. Check to see if $\overline{EF}$ is parallel to $\overline{CD}$. Are the two segments parallel?

_____

15. Alter the trapezoid by dragging one of the vertices.

16. Is the midsegment parallel to the two sides of the trapezoid?

_____

17. What can you conclude about the relationship between a midsegment and the two parallel sides of a trapezoid?

_____

18. Measure, label and record the following lengths.

$\overline{AB}$ = _____ $\overline{EF}$ = _____ $\overline{CD}$ = _____

19. From the Measure Toolbar, select **Calculate**.

20. Calculate (AB + CD)/2.

a. Click on (on the Calculate Toolbar.

b. Click on the numeric value of $\overline{AB}$.

c. Click on + on the Calculate Toolbar.

d. Click on the numeric value of $\overline{CD}$.

e. Click on) on the Calculate Toolbar.

f. Click on ÷ on the Calculate Toolbar.

g. Type **2**.

h. Double-click on = and drag the result in the dotted box onto your sketch.

i. Double-click where you want the result to appear.

21. From the Measure Toolbar, select **Tabulate**.

22. Create a table.

a. Click and hold where you want the upper left corner of the table to appear.

b. Drag to the lower left to create a table that is four columns by four rows.

c. Click when you have finished.

d. From the Measure Toolbar**,** select **Tabulate**.

e. Click on the numeric value of $\overline{AB}$ when the message ***Tabulate this value*** appears.

f. Tabulate the following numeric values in order: $\overline{CD}$, the "result," then $\overline{EF}$.

23. Alter the trapezoid by dragging a vertex.

24. From the Measure Toolbar, select **Tabulate**.

25. Click on the numeric value of $\overline{AB}$. This enters information in another row in the table.

26. Alter your trapezoid again and enter your measurements into the table.

27. Record the values from the screen table in the table below.

AB=	CD=	Result =	EF=

28. What can you conclude about the length of the midsegment with relation to the length of the two parallel sides of a trapezoid?

_____

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