NAME: _____

INVESTIGATING THE DIAGONALS OF A RECTANGLE

The diagonals of a rectangle are line segments connecting the opposite vertices of the rectangle.

1.) Using the **Selection Arrow Tool**, select points A and C. Go to the **Construct Menu** and select **Segment**. Click in an open part of the screen to deselect the line segment. Repeat with points B and D.

Diagonal Investigation #1 of a Rectangle: Are the Diagonals of a Rectangle Congruent?

2.) Using the **Selection Arrow Tool**, select diagonal AC and diagonal BD. Go to the **Measure Menu** and select **Length**. Record the measurements below. Click in an open part of the screen to deselect the measurements.

$m\overline{AC}$ = _____

$m\overline{DB}$ = _____

3.) Drag point B of your rectangle around while you watch the diagonal measurement of AC and the diagonal measurement of DB.

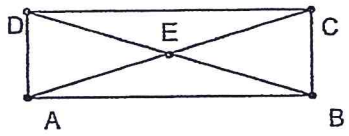
4.) As the rectangle is changing, are the diagonals of the rectangle remaining congruent?

_____

5.) Are the diagonals of the rectangle congruent? _____

6.) Using the **Selection Arrow Tool**, select diagonals AC and DB. Go to the **Construct Menu** and select **Intersection.**

7.) Using the **Text Tool**, label this point E. Your sketch should look like this:



8.) Using the **Selection Arrow Tool**, click in an open part of the screen to deselect point E.

Diagonal Investigation #2 of a Rectangle: Do the Diagonals of a Rectangle Bisect Each Other?

A line segment is BISECTED if it is cut into two congruent pieces.
Diagonal AC cuts diagonal DB into two pieces and vice versa. You will investigate if the diagonals bisect each other into two congruent pieces.

9.) Using the **Selection Arrow Tool**, select points A and E. Go to the **Measure Menu** and select **Distance**. Click in an open part of the screen to deselect the measurement. Select points E and C, go to the **Measure Menu** and select **Distance**. Click in an open part of the screen to deselect the measurement. Record the measurements below.

$m\overline{AE} =$ _____

$m\overline{EC} =$ _____

What do you notice about the lengths of line segment AE and line segment EC?

_____

10.) Using the **Selection Arrow Tool**, select points D and E. Go to the **Measure Menu** and select **Distance**. Click in an open part of the screen to deselect the measurement. Select points E and B, go to the **Measure Menu** and select **Distance**. Click in an open part of the screen to deselect the measurement. Record the measurements below.

$m\overline{DE}$ = _____

$m\overline{EB}$ = _____

What do you notice about the lengths of line segment DE and line segment EB?

_____

11.) Drag point B of your rectangle.
As the rectangle is changing, are the line segment pairs AE and EC remaining congruent to each other?
As the rectangle is changing, are the line segment pairs DE and EB remaining congruent to each other?

_____

_____

_____

12.) Using the **Selection Arrow Tool**, click in an open part of the screen to deselect point B.

13.) Do the diagonals of a rectangle bisect each other? _____

Diagonal Investigation #3 of a Rectangle: Are the Diagonals of a Rectangle Perpendicular?
Two lines are said to be perpendicular if the angles formed at their intersection are 90 degrees.

14.) Diagonals AC and DB form four angles where they intersect inside the rectangle at point E. Measure these four angles and record your results. (Follow step #18 from constructing a rectangle if you do not remember how to measure an angle.)

$m\angle AEB =$ _____
$m\angle BEC =$ _____
$m\angle CED =$ _____
$m\angle DEA =$ _____

15.) Drag point B of your rectangle around while you watch these four angle measurements.
What do you notice?

_____

16.) Are the diagonals of a rectangle perpendicular? _____

17.) Get the **Text Tool** and double click anywhere on the screen. Type the following information on your screen:

- Full Name
- Mathematics Teacher
- Hour
- Name of Polygon

18.) Go to the **File Menu** and select **Print Preview**. Stay on this screen and get the teacher's initials: _____

19.) Select **Print**.

20.) You explored three investigations about the diagonals of a rectangle. Find out from other students around you if their investigations produced the same results. Write out the three investigations below and what you discovered about the diagonals of all rectangles.