NAME: _____

CONSTRUCTING A RECTANGLE

In your definition, make a statement about the sides and the angles.

A rectangle is a quadrilateral with _____

_____

Constructing a Rectangle on the Geometer's Sketchpad

1.) Go to the **Edit Menu** and select **Preferences**. Click the following settings:

Angle Unit:	Degree	**Precision:**	Units
Distance Unit:	cm	**Precision:**	Tenths
Ratios:		**Precision:**	Tenths

Click **OK**.

2.) Choose the **Segment Tool** and draw an eight or nine centimeter long horizontal line segment towards the bottom of the screen.

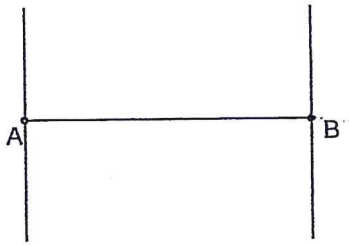
3.) Choose the **Selection Arrow Tool** and click in an open part of the screen to deselect the segment.

4.) Choose the **Text Tool** and click on the left endpoint of the line segment to label it point A and click on the right endpoint of the line segment to label it point B. Your sketch should look like this:

5.) Using the **Selection Arrow Tool**, select point A and line segment AB.

6.) In order to construct a line through point A and perpendicular to line segment AB, go to the **Construct Menu** and select the **Perpendicular Line** option. Click in an open part of the screen to deselect the line.

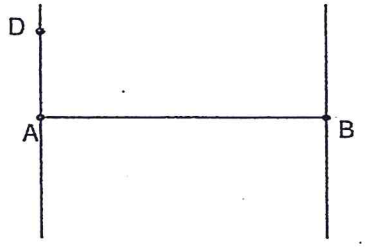
7.) Using the **Selection Arrow Tool**, highlight point B and the line segment AB. Go to the **Construct Menu** and select the **Perpendicular Line** option. A line through point B and perpendicular to line segment AB will appear. Click on an empty portion of the screen to deselect the line segment. Your sketch should now look like this:



8.) Using the **Selection Arrow Tool**, select the perpendicular line through point A. Go to the **Construct Menu** and choose **Point on Perpendicular Line.**

9.) Using the **Selection Arrow Tool**, move the new point so it is approximately three or four centimeters above point A.

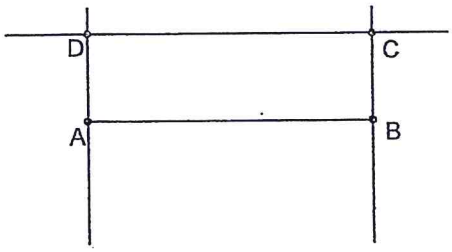
10.) Choose the **Text Tool** and click on this new point to give it a label of D. If the Text Tool does not label the point a D, double click on the letter given and change it to a capital letter D. Click **OK**. Your sketch should now look like this:



11.) With point D still selected (highlighted), choose the **Selection Arrow Tool** and also select line segment AB. Go to the **Construct Menu** and select **Parallel Line**. A parallel line will appear that runs through point D and is parallel to line segment AB. Notice that you now have a rectangle formed by the three new lines and line segment AB.

12.) Using the **Selection Arrow Tool**, with this new horizontal line still selected (highlighted), also select the line through point B, go to the **Construct Menu** and select **Intersection**.

13.) Choose the **Text Tool** and click on this new point to give it a label of C. If the Text Tool does not label the point a C, double click on the letter given and change it to a capital letter C. Click **OK**. Your sketch should now look like this:



14.) Choose the **Selection Arrow Tool** and click anywhere in an empty portion of the screen to deselect the sketch. Select the three new lines, go to the **Display Menu** and choose the **Hide Lines** option. Your new lines will be hidden, however, points C and D will still be there. Your sketch should now look like this:

15.) Use the **Selection Arrow Tool** and select points A and D. Go to the **Construct Menu** and select **Segment**. Click in an empty part of the screen to deselect the line segment AD. Repeat this process with points D and C and finally with points C and B.

16.) Using the **Selection Arrow Tool,** select the four sides of your rectangle. Go to the **Measure Menu** and select **Length**. All four line segments should appear on the screen. Record the lengths below.

$m\overline{AB} =$ _____

$m\overline{BC} =$ _____

$m\overline{CD} =$ _____

$m\overline{DA} =$ _____

17.) Click anywhere on the screen to deselect the side length measurements.

18.) Use the **Selection Arrow Tool**, click on Points BAD in that order to measure Angle A. Angles are named by three points. The identified angle is the letter in the middle. Angle A could have also been measured by clicking on Points DAB. Go to the **Measure Menu** and select **Angle**. Click anywhere on the screen to deselect the angle measurement.

$m\angle BAD =$ _____

19.) Use the **Selection Arrow Tool** and click on Points ABC or Points CBA. Go to the **Measure Menu** and select **Angle**. Click anywhere on the screen to deselect the angle measurement.

$m\angle ABC =$ _____

20.) Use the **Selection Arrow Tool** and click on Points BCD or Points DCB. Go to the **Measure Menu** and select **Angle**. Click anywhere on the screen to deselect the angle measurement.

$m\angle BCD =$ _____

21.) Use the **Selection Arrow Tool** and click on Points CDA or Points ADC. Go to the **Measure Menu** and select **Angle**. Click anywhere on the screen to deselect the angle measurement.

$m\angle CDA =$ _____

22.) Use the **Selection Arrow Tool** and go to the **Measure Menu** and select **Calculate**. Click on one of the angle measurements, then the addition sign, etc. Once all the angles have been included in the addition sentence, click OK. Click anywhere in an open part of the screen to deselect the sum of the angles.

What is the sum of the angles of the rectangle? _____

23.) Using the **Selection Arrow Tool**, drag point B around. Your rectangle should stay together. Get teacher initials: _____

24.) As you drag point B around, explain what happens to the four angle measurements.

_____

_____

25.) As point B is dragged around, the sum of the four angles remains: _____.

26.) Explain what is happening to the lengths of the opposite sides of the rectangle as you are dragging point B around the screen.

Sides AB and DC: _____

_____

Sides AD and BC: _____

_____

27.) Using the **Selection Arrow Tool**, click in an open part of the screen to deselect all parts of the sketch.