

Geometer's Sketchpad Investigation: Parallel Lines and Transversals

Name: _____

Date: _____

In this investigation you will discover the properties of angles when you have a pair of parallel lines that are cut by a transversal.

You must turn in a copy of your Geometer's Sketchpad design along with this packet with completed answers.

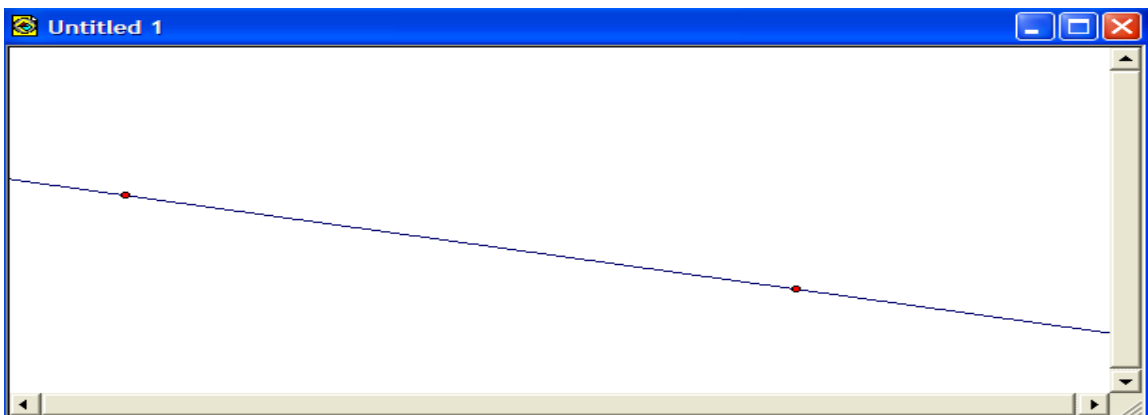
Sketch:

Step 1: Begin by double clicking on the Geometer's Sketchpad icon on your desktop. The opening screen will open with *Untitled 1* at the top.

Step 2: On the left hand side of the program is the tool bar. Select the straightedge tool, the fourth icon from the top and hold down. Four new icons will pop up to the right of the icon. You want to select the last icon, the line icon.

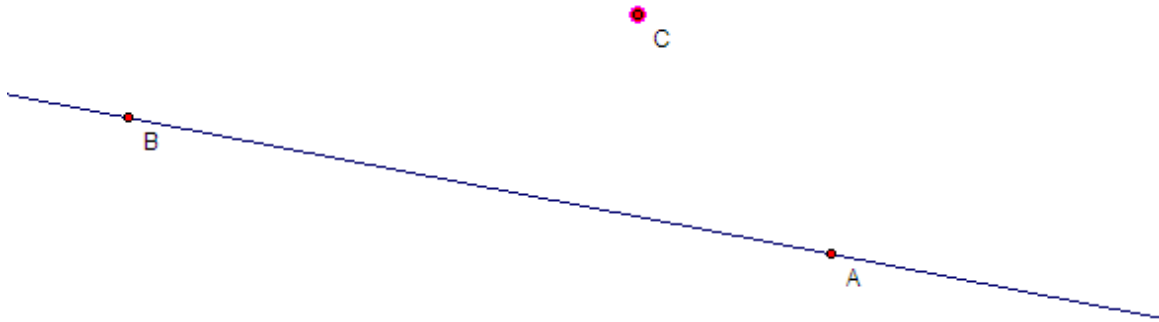


Step 3: Next place the cursor in the sketch area, near the upper left corner, and click once. You will create a point and a line with a moveable point on it that allows you to move your line in any direction. Move your point, with line attached, to the lower right corner. Your line will be formed.



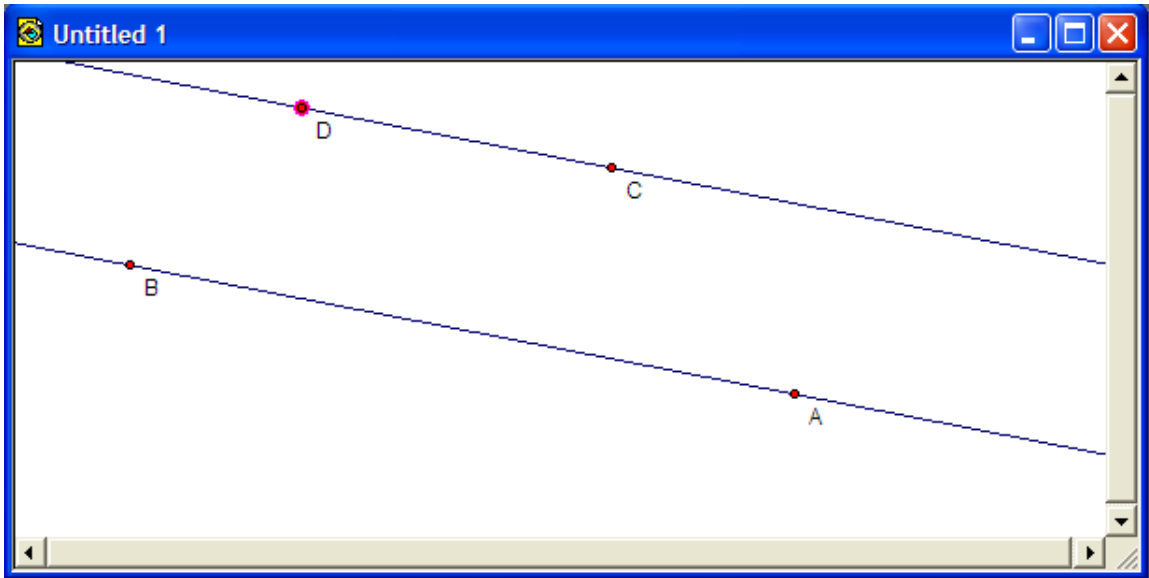
Step 4: Click on the selection arrow icon on the tool bar, this is the first icon on the left. In order to deselect the line click anywhere in the white space of the sketch area. Select the two points by clicking on them when the arrow is pointed on them, the arrow turns horizontally. Click on the display menu, and click label points. It will ask you if you want to label point for example A, click ok. Now your points should be labeled A and B.

Step 5: Click on the point tool icon. Create a point either above or below your line, but not directly on your line. Label this point as well.

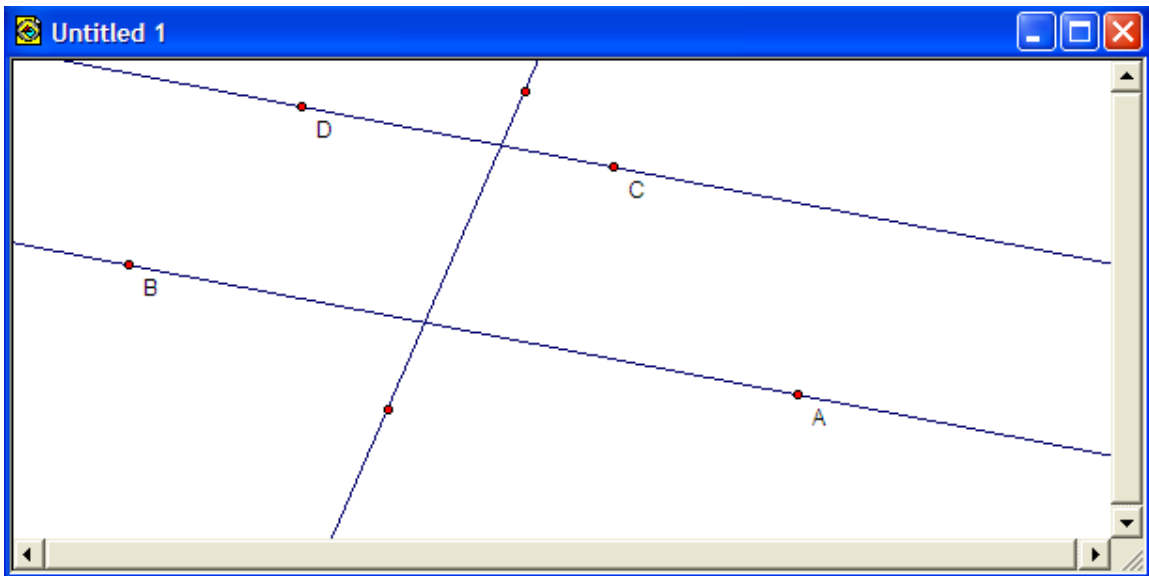


Step 6: You now want to create a parallel line. Click on the selection arrow tool icon again notice that point C is still highlighted, leave it highlighted and then highlight the line \overline{AB} , only. (make sure nothing else is selected, to deselect an item just click on it again) Click on the construct menu and go to parallel line. A parallel line is now formed through C.

Step 7: Next click on the point tool icon again, from the left tool bar, and make another point on the line through C, make the point to the left of point C. You will know if you are on the line because the line will highlight a light blue color. Create the point and then label the point D.

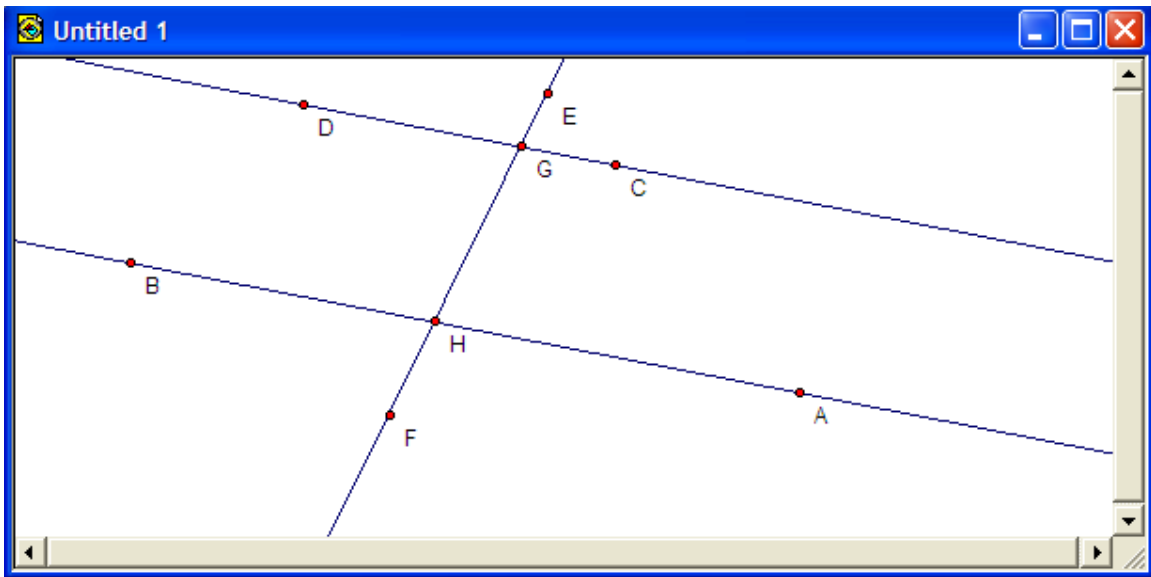


Step 8: You now want to create a transversal. A transversal is a line that intersects two or more coplanar lines at different points. Select the straightedge tool icon on the left and select the line tool. Create a line that intersects line \overline{CD} and line \overline{AB} at two different points between segments \overline{CD} and \overline{AB} and make sure that you have one point above line \overline{CD} and one point below line \overline{AB} .

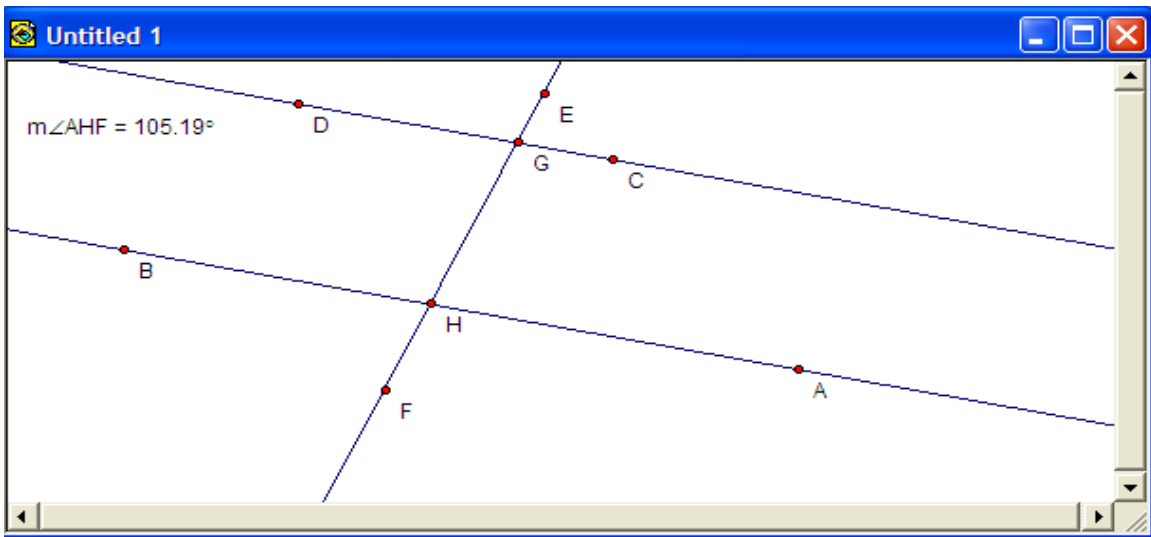


Step 9: Label your new points, E and F. Then Select only line \overleftrightarrow{CD} and line \overleftrightarrow{EF} and click on construct then click on intersection. The intersection of the two lines is now a point. Label this point, G.

Step 10: Do the same for lines \overleftrightarrow{AB} and \overleftrightarrow{EF} and label this point H.



Step 11: Next we need to measure the angles. Begin by clicking on point A, then click on point H, and finally click on point F. Then click on the Measure menu on the top tool bar, and click on angle. The measurement of the angle will appear in the top left hand corner.



Step 12: Repeat step 11 for the remaining angles and record the angles and there measurements in the space below.

Angle	<EHB	<EHA	<AHG	<BHG	<DGH	<DGF	<CGH	<CGF
Measurement								

Step 13: Click on point E and hold down the left mouse button, while you move the line EF. Move the line to another spot, still intersecting the other two lines, and observe what happens to the angle measurements as you move the line. Once you choose a new location for the line, record the angles and there measurements in the space below.

Angle	<EHB	<EHA	<AHG	<BHG	<DGH	<DGF	<CGH	<CGF
Measurement 2								

Investigate:

What do you notice about the measures of the angles as you move the line \overleftrightarrow{EF} ? What do you notice about angles, <DGH and <GHA, <CGH and <AHG, <CGF and <EHB, and <GHB and <FGD?

Conjecture: Write down your conjectures below.

Present Your Findings:

Discuss your findings with your group. To present your findings you could:

1. Each member take a pair of angles and show what happens when you move the transversal to another location. Explaining then, how you came up with your conjecture.
2. Add captions to one of the group member's sketches, commenting on what each member's conjecture is.

Explore More:

1. Create another object with a pair of parallel lines that are cut by a transversal and investigate whether your conjectures hold.
2. Create another set of parallel lines cut by a transversal and calculate only 2 or 3 of the angles, then give your paper to another student to calculate the other angles from the theorems we just discovered.