

Investigation: Parallel Lines and Angles


Name: _____

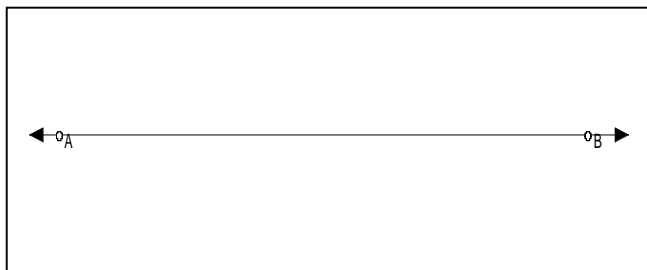
Date: _____


In this investigation you'll discover properties of the angles of parallel lines cut by a transversal.

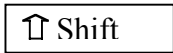
1. Open a new sketch by double-clicking on the Sketchpad icon.
2. Set the Preferences to show labels for straight objects and points.
 - Choose Preferences from the Display menu.
 - Click Points and Straight Objects in the Autoshow Labels section, then click OK.

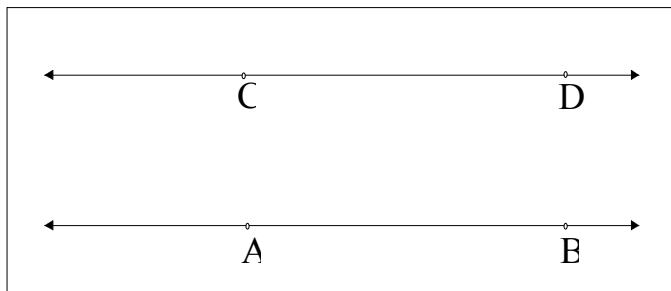
Sketch


3. Draw a line.
 - Choose the line tool on the toolbox, by holding down the left mouse and drag the pointer over until you see this .
 - Move the pointer to the center-right of the sketch plane. Click the mouse button and drag mouse to the center-left. Then your screen should like the diagram.



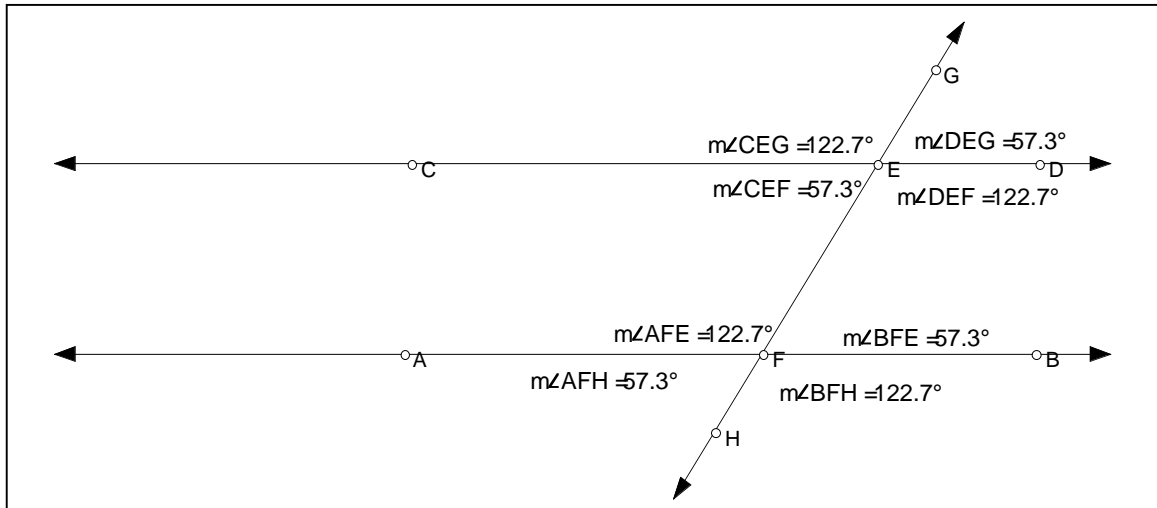
4. Draw a parallel horizontal line to your first line.
 - On the toolbox, select the point tool.
 - Move the pointer either 2-3 inches above or below point A and click.
 - On the toolbox, select the arrow. .

- Select the line AB, by clicking on it. Next, press down on the shift key. While pressing down on the shift key, move the pointer to your third point and click the mouse. (The segment and point should be highlighted.) 
- Select Parallel line from the Construct menu.
- Select point tool from the toolbox, on the parallel line you just constructed place a second point on it above point B. (When putting a point on the parallel line, check the bottom left hand corner of screen to make sure it states "Point on line"). Your diagram should look similar to the diagram.



5. Draw a transversal (intersects the two parallel lines).
 - Select the point tool on the toolbox.
 - Place one point on each line you already constructed between points A & B, and points C & D. The two new points will be used to create a new line (transversal).
 - Select the arrow on the toolbox.
 - Select one of the points you just created. Now, press down on the shift key. While pressing down on the shift key, move the pointer to the other point you just created.
 - Select the line tool on the toolbox. .
 - Next, press Ctrl + L. (A line will appear going through the two points).
 - Select the point tool on the toolbox.

- Place a point on both outer parts of the line you just created. The reason we are creating more point is it will be easier to measure angles later on. Your diagram should look similar to the diagram on the next page.



- Find the measurements of all eight angles.
 - Select the arrow on the toolbox.
 - Press down on the shift key. While pressing down on the shift, select three points that create an angle.
 - Select Angle from the Measure menu. (The measure of that angle will appear in the top right hand corner of your screen. You can move the angle by clicking on it and dragging it to the angle.)
 - Record the angle name in the first row. Record Measure of the angle in the chart below in the row marked 1st measurements.
 - Repeat the last three steps until you measure all eight angles.

Angles								
1 st measurements								
2 nd measurements								

- Drag the point E or F that corresponds to your graph a little to the left or right. While you drag the point, you will see all the angle measurements change.
 - Record the new angle measurement in the chart above at 2nd measurements.

Investigate

- What do you notice about the measure of angles DEG & BFE, CEF & BFE, DEF & BFE, CEG & BFH? Do you notice any relationships with the measurements of the angles? How are they related? What happens to the measures of angles DEG & BFE when you move the transversal that cuts into the two parallel lines. Write a paragraph to answer these questions and describe your finding in the space below.

Conjecture: Write your conjectures below.

Present your Findings

9. Discuss your findings with your neighbor. To present your finding, you could print a captioned sketch showing your measurement and your conjectures along with any explanation you might have for why your conjecture is true.

Explore More

10. Make a conjecture about the measures of angles CEF and BFE when two parallel lines are cut by a transversal.
11. Calculate the sum of angles DEF and BFE. Make and test a conjecture about the sum.

To calculate the sum of to angles

- Select Calculate from the Measure menu.
- Next click on the measurement of angle DEF.
- Next press on the addition sign.
- Then click on the measurement of angle BFE.
- Finally click on ok. The sum of the two angles will appear below the last measurement angle you dragged earlier.
