Name: Geometu 1. Define t Vertical A	Period: Date: Date: Date: Period: Date: Date: Period: Date: Date: Period: Period: Date: _	ri Jr.
Adjacent	Angles	
Complem	entary Angles	
Suppleme	ntary Angles	
Part 1: Ve Draw two • Dra lind • • • • • • • • • • • • • • • • • • •	ertical and Adjacent Angles intersecting lines and measure the angle formed. aw \overrightarrow{AB} and \overrightarrow{CD} that intersect near the center of the screen. Label both es similar to the picture to the right. Press [WINDOW], and then highlight Line. Press [ENTER]. Use your cursor and press [ENTER] to lay down your first point, then move your cursor away from the first point and press [ENTER] to lay down the second point. Press [GRAPH]. Scroll up or down to highlight Alph-Num. Press [ENTER]. Move your cursor to one of your two endpoints. When your endpoint start Use green letters to the top right of each key to name your endpoints. For B . Press [ENTER]. Move your cursor to the other endpoint and repeat. Repeat all steps for \overrightarrow{CD} . nstruct the intersection point of \overrightarrow{AB} and \overrightarrow{CD} . Label this point O . Press [WINDOW], and then highlight point, then \boxdot see the sub menu. Scroll a Intersection. Press [ENTER]. Move your cursor to the intersection of your two lines segment and the pe both begin to "dance". Press [ENTER]. Name this point O using the Alph-Num as above. Press [ENTER]. d the measure of each of the four angles. Place these measures in the inter Press [GRAPH]. Scroll up or down to highlight Measure, then \boxdot to see the s Press [ENTER]. Move your cursor to endpoint A . Press [ENTER]. Move your cursor to endpoint A . Press [ENTER]. Move your cursor to endpoint O . Press [ENTER]. Move your cursor to endpoint A . Press [ENTER]. Move your cursor to endpoint A . Press [ENTER]. Move your cursor to endpoint C . Press [ENTER]. Move your cursor to endpoint C . Press [ENTER]. The Hand Tool is activated. Move the measurement to the interior of the a	down to highlight rpendicular bisector until ior of each angle. ub menu. Highlight Angle.

Press ENTER. Remember you can increase or decrease the accuracy of the measurement with the \mp or \Box key, respectively.

• Repeat for the three other angles.

Exploration:

2. Drag point A or point B to four different locations where the angles have different measures. Find $m \angle AOC$, $m \angle BOD$, $m \angle COB$, and $m \angle AOD$ for each location. Collect and record your data in the table below.

Location	1^{st}	2^{nd}	$3^{\rm rd}$	4^{th}
m∠AOC				
m∠BOD				
m∠COB				
m∠AOD				
. 1	1 .1	.1		

3. If $\angle AOD$ and ______ are vertical angles, then the m $\angle AOD$ ______.

If $\angle AOC$ and ______ are vertical angles, then the $m \angle AOC$ ______.

4. Identify all pairs of adjacent angles. (4 pairs)

6. If $\mathbf{m} \angle \mathbf{AOD} = 90^{\circ}$, what would be the measure of the remaining angles? Verify your answer using Cabri Jr.

7. Write a **conjecture** about two lines that intersect at a 90° angle.

8. Drag point **A** or point **B** so that $\mathbf{m} \angle \mathbf{AOD} = \mathbf{m} \angle \mathbf{AOC}$. What must be true about $\overrightarrow{\mathbf{AB}}$ and $\overrightarrow{\mathbf{CD}}$?

Show the teacher your calculator screen. Teacher Signature:

Part 2: Supplementary Angles

9. Draw two adjacent angles that are supplementary.

 Clear the previous construction. Press GRAPH and scroll down to Clear then for the submenu and scroll down to All. Press ENTER.



- Draw a horizontal line \overrightarrow{AB} near the center of the screen.
 - Press WINDOW, and then highlight Line. Press ENTER. Use your cursor and press ENTER to lay down your first point, then move your cursor away from the first point and press ENTER to lay down the second point.
 - Press GRAPH. Scroll up or down to highlight Alph-Num. Press ENTER.
 - Move your cursor to one of your two endpoints. When your endpoint starts flashing. Press ENTER.
 - Use green letters to the top right of each key to name your endpoints. For instance, press $\overrightarrow{\text{APPS}}$ for **B**.
 - Press ENTER.
 - Move your cursor to the other endpoint and repeat.
- Construct \overline{CD} so that point C is on \overline{AB} between point A and point B, and point D is above the line.
 - Construct a point \mathbf{C} on the line between \mathbf{A} and \mathbf{B} .
 - Press WINDOW, and then highlight Point, then
 → to see the sub menu. Scroll down to highlight
 Point On. Press ENTER].
 - Press ENTER. Move your cursor in between A and B. When the line is "dancing" press ENTER.
 - Press GRAPH. Scroll up or down to highlight Alph-Num. Press ENTER.
 - Move to the last point added and press ENTER. Press PRGM, for C, then press ENTER again.
- Measure $\angle ACD$ and $\angle DCB$. Place these measures in the interior of each angle.
 - Measure $\angle ACD$.
 - Press GRAPH. Scroll up or down to highlight Measure, then to see the sub menu. Highlight Angle. Press ENTER.
 - Move your cursor to endpoint **A**. Press ENTER.
 - Move your cursor to endpoint C. Press ENTER.
 - Move your cursor to endpoint **D**. Press ENTER.
 - Your Hand Tool will be activated and carrying your measurement. Move your measurement to the interior of $\angle ACD$ and press ENTER.
 - Measure $\angle DCB$ and place the measurement in the interior of $\angle DCB$ as above.

- Calculate the sum of $m \angle ACD$ and $m \angle DCB$. Label the calculation and place it near the bottom of the screen.
 - Press GRAPH. Scroll up or down to highlight Calculate. Press ENTER.
 - Move your arrow until your angle measurement of $\angle ACD$ is blinking. Press ENTER. Press +.
 - Move your arrow until your angle measurement of $\angle DCB$ is blinking. Press \blacksquare . Press \blacksquare .
 - Your Hand Tool will be activated and carrying your sum. Move your measurement anywhere you would like to place it and press ENTER.

Exploration:

10. Change the size of the angle by dragging **D** to the left and right and by dragging **D** to the other side of \overrightarrow{AB} . Observe the changes in the measures and note how they are related and record them in the table below.

Location	1^{st}	2^{nd}	3 rd	4 th
m∠ACD				
m∠DCB				
m∠ACD+m∠DCB				

11. True or False: Consider the following statements and use a construction to determine if they are valid. Be sure to provide written arguments for your conclusions.

- a) Supplementary angles can be drawn without having vertical angles. True or False:_____
- b) Vertical angles can be drawn without having supplementary angles. True or False:_____
- c) Two adjacent angles can be drawn that are not supplementary. True or False:_____
- d) Any two non-adjacent angles are vertical angles. True or False:_____

Show the teacher your calculator screen. Teacher Signature:

Example 1: Find the value of **x**.

$6\mathbf{x} = 3\mathbf{x} + 360$	Vertical angles are congruent
$3\mathbf{x} = 360$	Subtract 3x from both sides



- $\mathbf{x} = 120$ Divide both sides by 3
- 12. Find the value of **x** and **y**.



13. Find the value of **x**.



14. Find the value of **x**.

