DO Now

If you haven't already done so, please collect a Do Now from the tray on the supply table and sit in your assigned seat and complete it in **silence**.

Thank you.

Objective

ﾒSWBAT know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.

Definitions

Guided NOTES

Angle

 Two rays or line segments sharing a common endpoint. The difference in direction of the two parts is called the angle.

Circle

 The set of points on a plane at a certain distance, or radius, from a single point, the center.

Perpendicular Line

 Two lines that intersect at right angles.

Parallel Line

ଓ Lines in a plane that do not share any points and never intersect.

Line segment

- A line with two endpoints.
- Written as $\overline{PQ}$

Point

 An exact position or location in a given plane.

Line

- The set of points between two points P and Q in a plane, and the infinite number of points that continue beyond those points.
- Written as $\overleftrightarrow{PQ}$

Distance along a line

 The linear distance between two points on a given line.

Right angle

An angle measuring 90 degrees.

Acute angle

An angle measuring greater than 90 degrees but less than 180 degrees.

Obtuse angle

   An angle measuring less than 90 degrees but greater than 0 degrees.

Check for Understanding

Marta wants to draw a perfect circle on canvas, but her compass is broken. She decides to take a shoelace from one of her sneakers and a pushpin from her drawing desk. She ties the shoelace around a pencil and then pins the other end of the shoelace into the center of the canvas. Marta then stretches the shoelace out until it's pulled tight, and places the pencil point on the canvas. Keeping the shoelace straight, she moves the pencil around the canvas and begins to draw out a circle.

Answer

1. Will Marta's approach to drawing a perfect circle work? Why or why not?

   Marta's method will yield a perfect circle because she is drawing a path such that every point on it will be the same distance from the center.

2. How could Marta show that the drawing is or is not a perfect circle?

   Marta could measure the distance from one side of her drawing through the center point made by the pin to the other side of her drawing. This measurement should be the same as any distance from one side of the drawing through the center point to the other side of the drawing.

Example 1

Refer to the figures below. Can a line segment be defined using the points *A* and *B*? Can a line segment be defined using the point *C*? Justify your response to each question.

Answer

1. The points *A* and *B* can be used to define a line segment because *A* and *B* are on the same line and are unique points.
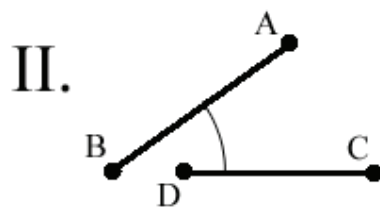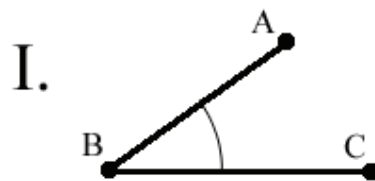
2. The point *C* cannot be used to define a line segment because there is not a second point defined on the line. ✓

Example 2

Refer to the figures below. In the first, do the line segments $\overline{AB}$ and BC form an angle? In the second figure, do the line segments $\overline{AB}$ and $\overline{CD}$ form an angle? Justify your response to each question.

I.

II.

Answer

1. In the first figure, the line segments $\overline{AB}$ and $\overline{BC}$ meet the angle definition of two lines, rays, or line segments intersecting; the two segments form an angle.
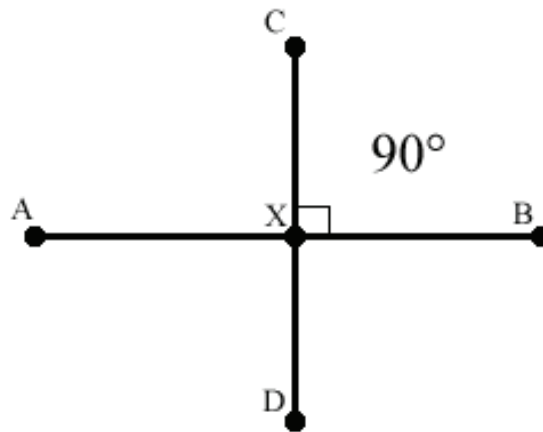
2. In the second figure, the line segments $\overline{AB}$ and $\overline{CD}$ do not intersect, so they do not form an angle.

Example 3

By definition, $\overline{AB}$ is perpendicular to $\overline{CD}$ because $m\angle CXB$ is 90°. What are the measures of $\angle AXC$, $\angle AXD$, and $\angle DXB$?
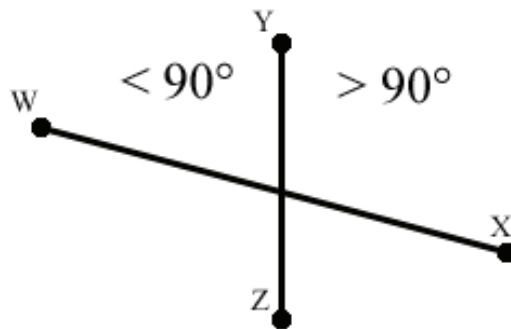
Answer

1. The measures of $\angle AXC$, $\angle AXD$, and $\angle DXB$ are all 90°. The importance of the perpendicular relationship is that all four angles created by the intersection are equal.

2. In the figure that follows, we can see the result when the lines are not perpendicular: the angles of intersection are not equal.

$< 90°$ $> 90°$

Example 4

Given the following:

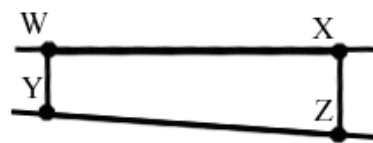$$\overline{AC} \cong \overline{BD}$$ $$\overline{WY} < \overline{XZ}$$
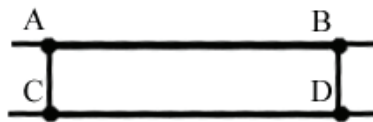
$$\overline{AB} \perp \overline{AC}$$ $$\overline{WX} \perp \overline{WY}$$

$$\overline{AB} \perp \overline{BD}$$ $$\overline{WX} \perp \overline{XZ}$$

Are $\overline{AB}$ and $\overline{CD}$ parallel? Are $\overline{WX}$ and $\overline{YZ}$ parallel? Explain.

Answer

1. $\overline{AC}$ and $\overline{BD}$ intersect $\overline{AB}$ at the same angle and $\overline{AC} \cong \overline{BD}$. $\overleftrightarrow{AB}$ will never cross $\overleftrightarrow{CD}$. Therefore, $\overline{AB}$ is parallel to $\overline{CD}$.
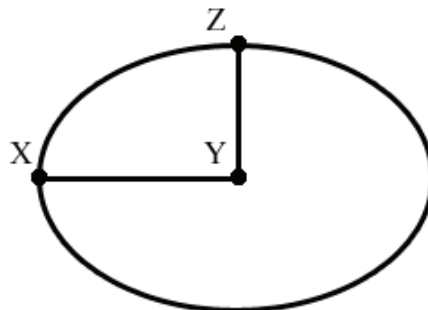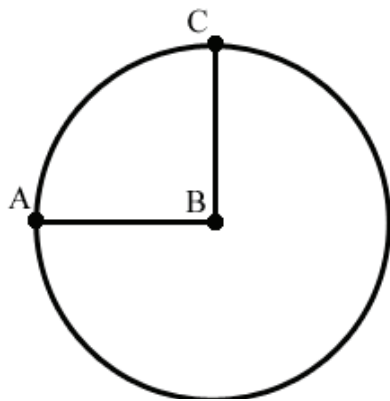
2. $\overline{WY}$ and $\overline{XZ}$ intersect $\overline{WX}$ at the same angle, but $\overline{WY} < \overline{XZ}$. As you move from Z to Y on $\overleftrightarrow{YZ}$, you move closer to, and will eventually intersect, $\overleftrightarrow{WX}$. Therefore, $\overline{WX}$ is not parallel to $\overline{YZ}$. ✔

Example 5

Refer to the figures below. Given $\overline{AB} \cong \overline{BC}$, is the set of points with center B a circle? Given $\overline{XY} > \overline{YZ}$, is the set of points with center Y a circle?

Answer

1. The set of points with center *B* is a circle because all points are equidistant from the center, *B*.

⬇

2. The set of points with center *Y* is not a circle because the points vary in distance from the center, *Y*. ✔
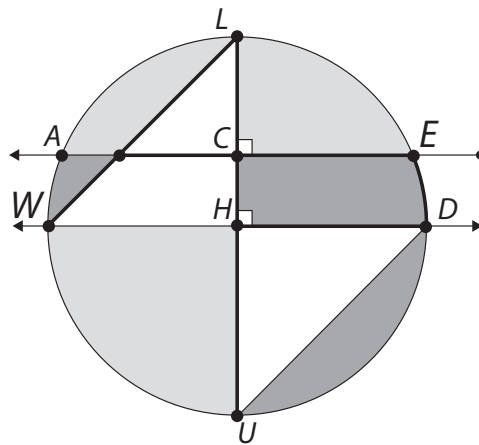
Guided Practice

Walch Education contracted Ryan Icons to design a logo for the company. They requested the logo be circular and contain the following elements:

- a line
- a ray
- a line segment
- 2 pairs of parallel lines
- 1 pair of perpendicular lines

Identify the elements requested in the submitted logo shown below.

Independent Practice (SILENT)

Use what you've learned to answer the questions that follow.

1. What is the part of a line with two endpoints *P* and *Q*? How is it written?

2. What is the definition of a circle?

3. What is a term used to describe two line lines that intersect to form a right angle?

4. What is the definition of a point?

5. What type of angle has a measure that is greater than 0º but less than 90º?

Exit Ticket (SILENT)

Name an example of each of the following:

1. Line Segment: _____

2. A Line: _____

3. A Ray: _____

4. Name the angle represented with the number 1 using 3 letters. _____

5. Is this angle an obtuse, acute, or right angle? _____