What do you think the term *geometric constructions* implies?

The following tools are used in geometric constructions.

*Straightedge*  
*Compass*

Which of the tools can help you draw a line segment?

Which of the tools can help you draw a circle?

Constructions also involve labeling points where lines or arcs intersect.

An *arc* is a section of the ____________ of a circle, or any curve.
Consider the following figure where $EF$ was constructed perpendicular to $BC$.

Label each part of the figure that shows evidence of the use of a straightedge with the letters SE.

Label each part of the figure that shows evidence of the use of a compass with the letter C.

**Let’s Practice!**

1. Follow the instructions below for copying $AB$.
   - Mark a point $M$ that will be one endpoint of the new line segment.
   - Set the point of the compass on point $A$ of the line segment to be copied.
   - Adjust the width of the compass to point $B$. The width of the compass width is now equal to the length of $AB$.
   - Without changing the width of the compass, place the compass point on $M$. Keeping the same compass’s width, draw an arc approximately where the other endpoint will be created.
   - Pick a point $N$ on the arc that will be the other endpoint of the new line segment.
   - Use the straightedge to draw a line segment from $M$ to $N$. 
Try It!

2. Construct $\overline{RS}$, a copy of $\overline{PQ}$.

3. Write down the steps you followed for your construction.

Consider the following figure where $\overline{CD}$ is the perpendicular bisector of $\overline{AB}$.

When you make a conjecture, you make an educated guess based on what you know or observe.

Make a conjecture as to why $\overline{CD}$ is called the perpendicular bisector of $\overline{AB}$.

A **bisector** divides lines, angles, and shapes into two equal parts.

A **perpendicular bisector** is perpendicular to a line segment and divides the line segment into two equal parts.
Let's Practice!

3. Follow the instructions below for constructing the perpendicular bisector of \( AB \).
   - Start with \( AB \).
   - Place your compass point on \( A \), and stretch the compass more than halfway to point \( B \).
   - Draw large arcs both above and below the midpoint of \( AB \).
   - Without changing the width of the compass, place the compass point on \( B \). Draw two arcs so that they intersect the arcs you drew in step 3.
   - With your straightedge, connect the two points of where the arcs intersect.

Construct a perpendicular bisector of line segment \( AB \).

Try It!

4. Construct the perpendicular bisector of \( JK \) and \( PQ \).

5. Consider the diagram below.
   - What type of geometric construction is being drawn?
   - What is the next logical step(s) to complete the construction above?
BEAT THE TEST!

1. Which of the following best describes the construction?

   ![Diagram of points A, B, C, D on line m]

   A. $AB \parallel CD$.
   B. $AB \cong CD$.
   C. $C$ is the midpoint of $m$.
   D. $D$ is the midpoint of $m$.

2. Fernando was constructing a perpendicular line at a point $K$ on the line below.

   ![Diagram of a partial construction with points P, K, Q] The figure below represents a depiction of the partial construction Fernando made.

   What should be the next logical step to his geometric construction?

   A. Increase the compass to almost double the width to create another line.
   B. From $P$, draw a line that crosses the arc above $K$.
   C. Without changing the width of the compass, repeat the drawing process from point $Q$, making the two arcs cross each other at a new point called $R$.
   D. Close the compass and use the straight edge to draw a line from the midpoint of the arc to point $K$. 

Section 2: Introduction to Geometry – Transformations and Constructions