BASIC CONSTRUCTIONS

Using a straight edge and compass, you will learn how to construct certain geometric objects.

CONSTRUCTING A LINE SEGMENT

X   Y

1. Using a straight edge, draw a line and a point on the line. Label the point P.
2. Place the compass at point X on the given segment. Adjust the compass setting so that the pencil is at point Y.
3. Using that setting, place the compass at point P and draw an arc that intersects the line. Draw a point at the intersection, and label it Q.

Your construction:

Conclusion: Since the compass setting used to construct $\overline{PQ}$ is the same as the distance from X to Y, PQ = _____. Thus, _____ $\cong$ _____.

CONSTRUCTING A SEGMENT BISECTOR

1. Place the compass at point X on the segment provided. Adjust the compass so that its width is greater than ½ XY.
2. Draw arcs above and below $\overline{XY}$.
3. Using the same compass setting, place the compass at point Y and draw arcs above and below $\overline{XY}$ so that they intersect the two arcs previously drawn. Draw points at the intersections, labeling them P and Q.
4. Use a straight edge to draw $\overline{PQ}$, draw a point at the intersection of $\overline{PQ}$ and $\overline{XY}$, labeling it M.

Your construction:

X ●————————————————————————————● Y
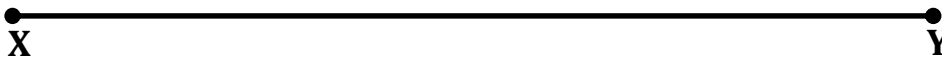
Conclusion: Point M is the _____ of $\overline{XY}$, and $\overline{PQ}$ is a_____ of $\overline{XY}$. Also, XM = _____ = ½ XY.

CONSTRUCTING AN ANGLE
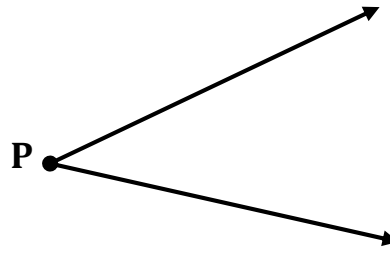
1. Use a straightedge to draw a ray. Label its endpoint T.
2. Place the tip of the compass at point P on the angle provided, and draw a large arc that intersects both sides of ∠P. Draw points at the intersections, labeling them Q and R.
3. Using the same compass setting, put the compass at point T and draw a large arc that starts above the ray and intersects the ray. Draw a point at the intersection, labeling it S.
4. Place the point of your compass on R and adjust so that the pencil tip is on Q.
5. Without changing the setting, place the compass at point S and draw an arc to intersect the larger arc you drew in step 3. Draw a point at the intersection, labeling it U.
6. Use a straight edge to draw $\overrightarrow{TU}$.

Your construction:

CONCLUSION: m∠QPR = _____by construction. Thus,

_____ ≅ _____ by definition of congruent angles.

CONSTRUCTING AN ANGLE BISECTOR

1. Put your compass at point A on the angle provided, and draw a large arc that intersects both sides of $\angle A$. Draw points at the intersections, labeling them B and C.
2. With the compass at point B, draw an arc in the interior of the angle.
3. Keeping the same compass setting, place the compass at point C and draw an arc that intersects the arc drawn in step 2. Draw a point at the intersection, labeling it D.
4. Draw $\overrightarrow{AD}$.

Your construction:

A
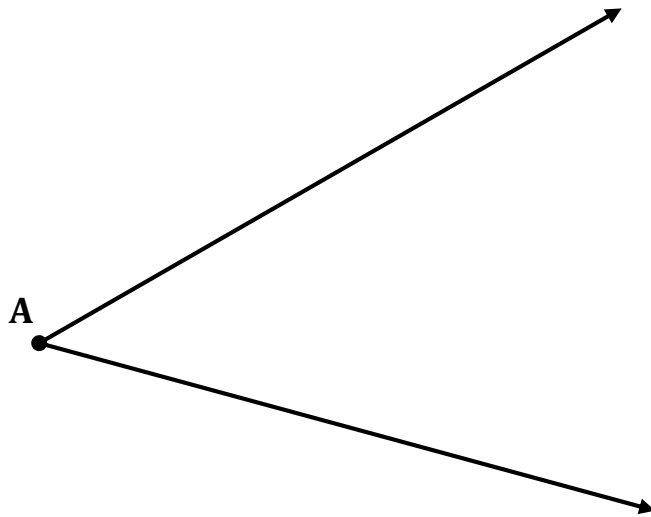
CONCLUSION:

By construction, _____ is the bisector of $\angle BAC$. Therefore,

$m\angle$_____ $= m\angle$_____ **and** $\angle$_____ $\cong \angle$_____.