Chapter 1-6

Geometry
Constructions
**Geometric Constructions**

**Construct a segment congruent to a given segment**

Given: \( AB \)

Construct a segment congruent to \( AB \).

1. Use a straightedge to draw a segment longer than the given segment.
   Label a point \( R \) at one endpoint of the new segment.
2. Place the compass tip at point \( A \) of the given segment.
   Adjust your compass width to equal the length of \( AB \).
3. Using this *same* compass setting, place the compass tip at point \( R \) and draw an arc. Label the intersection point \( S \).
4. Erase the excess segment.
5. \( AB \equiv RS \)

[Ref: http://mathopenref.com/constcopysegment.html]

**Construct a segment congruent to \( AB \).**

1. [Diagram of segment AB]
2. [Diagram of segment AB]
3. [Diagram of segment AB]
4. [Diagram of segment AB]
Construct an angle congruent to a given angle

Given: \( \angle A \)
Construct an angle congruent to \( \angle A \).

3. Draw a ray. Label the endpoint D.
4. Place the compass tip at the vertex of \( \angle A \). Draw an arc across both sides of the given angle. Label the points of intersection with the rays B and C.
3. Using this **same** compass setting, place the compass tip at point D (the new ray) and draw a long arc across the ray. Label the intersection point E.
5. Set the compass so that it is the width of BC.
5. Using this **same** compass setting, place the compass tip at point E and draw an arc, intersecting the arc from step 3. Label the intersection F.
6. Draw DF. \( \angle EDF \cong \angle BAC \)
Construct an angle congruent to a given angle

3.

4.
Perpendicular Bisector

**Given:** $\overline{AB}$

Construct the perpendicular bisector of $\overline{AB}$.

1. Choose a compass opening greater than $1/2$ of $\overline{AB}$ and less than the length of $\overline{AB}$. Place compass tip at $A$.
   Draw two arcs - above and below $\overline{AB}$.
2. Using the **same** compass opening, place compass tip at point $B$. Draw two arcs - above and below $\overline{AB}$.
3. Draw the line connecting the intersections of the two arcs. This is the perpendicular bisector of $\overline{AB}$.

*(Can also be used to find the midpoint of $\overline{AB}$.*)

http://mathopenref.com/constbisectline.html

Construct the perpendicular bisector of each of the following line segments.

1. 

2. 

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$\overline{AB}$

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$\overline{CD}$
Perpendicular Bisector

3.

4.
Angle Bisector

Given: \( \angle A \).

Construct the angle bisector of \( \angle A \).
1. Place the compass tip at point A. Draw an arc that intersects both rays of the angle. Label the points of intersection B and C.
2. Place the compass tip at point B and draw an arc in the interior of \( \angle A \).
3. Using this same compass setting, place the compass tip at point C and draw an arc that intersects the arc you drew in #2. Label the point of intersection Q.
4. Use a straightedge to draw AQ.

* This is the angle bisector of \( \angle A \).
5. \( \angle BAQ \equiv \angle QAC \)

Construct the angle bisectors for each of the following angles.

1.

2.

3.

4.