

**MATH 6: HANDOUT 14**  
**GEOMETRY: RULER AND COMPASS CONSTRUCTIONS II**

**CONSTRUCTIONS WITH RULER AND COMPASS**

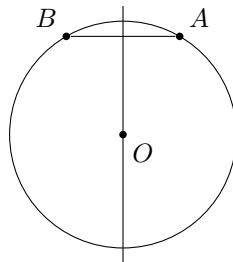
Here is a summary of operations we can do using a ruler and compass. You can freely use any of them in the problems below.

1. Construct the midpoint of a given segment  $AB$
2. Construct the perpendicular bisector of segment  $AB$ , i.e. a line that goes through the midpoint of  $AB$  and is perpendicular to  $AB$ .
3. Given a line  $l$  and a point  $A$  on  $l$ , construct a perpendicular to  $l$  through  $A$ .
4. Given a line  $l$  and a point  $P$  outside of  $l$ , construct a perpendicular to  $l$  through  $P$ .
5. Given an angle  $AOB$ , construct the angle bisector (i.e., a ray  $OM$  such that  $\angle AOM \cong \angle BOM$ ).

The following section explains the importance of these constructions.

**PERPENDICULAR BISECTOR AND ANGLE BISECTOR**

1. If two points  $A, B$  are on a circle, then the center of this circle lies on perpendicular bisector to  $AB$  (i.e., a line that goes through the midpoint of  $AB$  and is perpendicular to  $AB$ ).



2. If a circle is inscribed in the angle  $ABC$ , then the center of this circle lies on the angle bisector.

