

MATH 6: HOMEWORK 2.5
RULER AND COMPASS CONSTRUCTIONS 2

CONSTRUCTIONS WITH RULER AND COMPASS

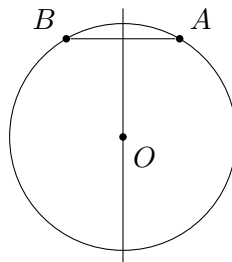
Here is a summary of operations we can do using a ruler and compass. You can freely use any of them in the problems below.

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 $\angle AOM \cong \angle BOM$).

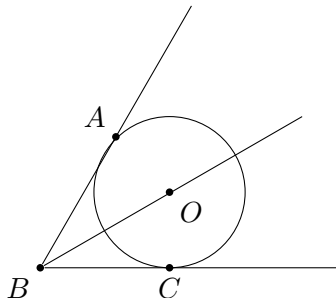
The following section explains the importance of these constructions.

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.

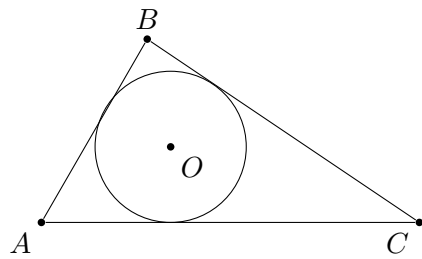
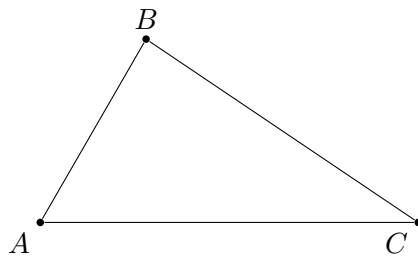


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All constructions below are to be done using ruler and compass only! Do it on a separate piece of paper!

1. Construct a rectangle with one side a and diagonal d .
2. Given length a , construct a square with side a .
3. Given a circle, construct an equilateral triangle inscribed in it. This means that all the vertices of the triangle are on the circumference.

4. Given a triangle $\triangle ABC$, construct a circle inscribed in the triangle (as shown on the right).
Hint: The center of the circle will be at the intersection of the angle bisectors of the triangle.



5. Given a triangle $\triangle ABC$, construct a circle circumscribed around the triangle (as shown on the right). *Hint:* Draw the perpendicular bisectors of two sides of the triangles.

