

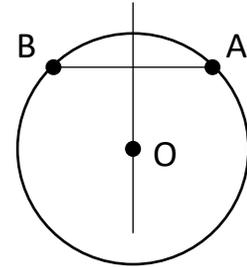
## Math 6b/c: Constructions with ruler and compass

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  $P$ .

### Perpendicular bisector (symmetry line)

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  $AB$ ).



## Homework 8 (due November 19, 2017)

All constructions below are to be done using ruler and compass only!

1. Given a line  $l$  and a point  $A$  on  $l$ , construct a perpendicular to  $l$  through  $A$ .
2. Given a line  $l$  and a point  $P$  outside of  $l$ , construct a perpendicular to  $l$  through  $P$ .
3. Construct a rectangle with one side  $a$  and diagonal  $d$ .
4. Construct a rhombus with one side  $a$  and diagonal  $d$ .
5. Given length  $a$ , construct a square with side  $a$
6. Construct a regular 12-agon.
7. Construct a right triangle, given a hypotenuse  $h$  and one of the legs  $a$ .
8. You have two fuses (specially treated cords, which burn slowly and reliably). Each of them would burn completely for one minute if lighted from one end. Using this, can you measure the time of 30 seconds? of 45 seconds? Note: some parts of the fuses may burn faster than others - so you cannot just measure half of the fuse and say that it will burn for exactly 30 seconds.