HW#7 is due November 18th; submit to Google classroom 15 minutes before the class time.
Please, write clearly which problem you are solving and show all steps of your solution.

## Summary from the classwork

❖ <u>**Operations**</u> 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 the line *l* through *A*.
4. Given a line *l* and a point *P* outside of *l*, construct a perpendicular to the line *l* through *P*.

❖ <u>**Perpendicular bisector**</u> (symmetry line)

   If two points *A, B* are on a circle, then the center of this circle lies on the perpendicular bisector to *AB* (i.e., a line that goes through the midpoint of *AB* and is perpendicular to *AB*).
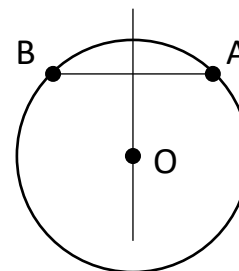
❖ **Solution format** for every problem (*what we need to include*):
<u>A)</u> <u>Give a recipe</u> (the construction procedure) for constructing the required figure using only a ruler and compass. We can use only the following operations:
   o Draw a line through two given points
   o Draw a circle with a center at a given point and given radius
   o Find and label on the figure intersection points of already constructed lines and circles.
<u>B)</u> <u>Analysis.</u> Prove or explain why our recipe does give the correct answer

Homework questions

All of the construction problems should be done by only using a ruler and a compass.

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 (dodecagon).
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.