Feedback 3-4

Most mistakes this time came from some omitted proofs of "obvious" statements (which looked correct but were in fact wrong).

- **Question 3.3:**
  - This is a straightforward check of the definition.
  - Main danger in "iff" questions: **don't forget to prove one of the directions!** Luckily, this time it only happened to a couple of students.
- **Question 3.5:**
  - Main difficulty: in part (a), the first group coming to a mind is the reflection group. Unfortunately, it does not have P as a fundamental domain!
  - To notice this, one should carefully look at the definition of fundamental domain. Otherwise, it seems that you have a tiling, so you have a fundamental domain (which is wrong when the group brings a tile to itself non-identically, as in this case).
  - After noticing that the reflection group does not work, most students tried to find another candidate group. "Lucky" students thought about the group generated by 2 translations (or 3, or 6 - but it is the same group). With this lucky idea it was easy to finish part (a) (by checking 3 parts of the definition).
  - Some students suggested some other groups, sometimes satisfying the conditions, sometimes not. To check whether your group is good you need to study the definition carefully! In particular,
    - if H contains a reflection with respect to a line cutting P, then P is definitely not a fundamental domain of H! (Why?)
    - If H contains a rotation with respect to a point contained in P, then P is definitely not a fundamental domain for H! (Why?)
- **Question 4.3:**
  - Most common mistakes:
    - Some students think that in ruler and compass questions the task is to use ruler and compass to produce an accurate drawing. No, you even **don't need to have ruler and compass** to solve the question, as your actual aim is:
      (1) **to write an algorithm** which would explain me, how can I use ruler and compass to do this construction, and
      (2) **to prove** that this algorithm constructs exactly what is required in the question.
      The algorithm without the prove only is worth of half of the marks.
    - Some solutions started by suggesting to construct
      - a diameter of the circle, or
      - a tangent to the circle, or
      - the point on the circle lying on a maximal distance from the given point X.

      All these operations are more complicated than (or almost as complicated as) constructing the centre of the circle. I would give (almost) no marks for such a solution (if the steps above are not described in details and proved).
    - Even a correct and well-explained construction is only a half of the work!
- **Question 4.4.**
  - Some students were not sure about what the question exactly is: is it about the whole sphere or about a part? is it about existence of a map for every domain or for some domain? **If you are unsure please, ask!**
  - Many students suggested stereographic projection. If you try to prove it gives the solution to the problem, you will immediately see it does not wirk for all spherical lines in the domain!
  - For the correct projection, it is very straightforward to check it works as needed.