Homework 01

Problem 1 (5 points)
   Suppose there were 2 naked eye observes, as good as Tycho Brahe, able to measure angles with $4'$ accuracy. Would they be able to estimate the smallest distance to Mars? Suppose that observers are situated at the opposite points of Earth and do their measurement simultaneously.

Problem 2 (5 points)
   Professor Mikhailov is extremely paranoid. Shall he worry that a spy satellite can see what chapter of our text book he is reading? Assume that the spy telescope is good as 2.5 billion dollars Hubble telescope with the prime mirror diameter of 2.4 m. Disregard the atmospheric distortion, measure the book font size yourself.

Problem 3 (5 points)
   The parallax of Proxima Centauri is $0.772''$. Let's hope that there is a Jupiter sized planet. Would we be able to resolve the disk of the planet with the Hubble telescope?

Problem 4 (5 points)
   Do the same estimation as in the previous problem but for Betelgeuse star which has a quite large diameter of around 1000 $R_\odot$, where the solar radius ($R_\odot$) is 6.995×10^8 m. The parallax of Betelgeuse is $0.00763''$.

Problem 5 (5 points)
   The maximum elongation of Mercury from the Sun is $28°$, estimate the Sun to Mercury distance in astronomical units.