A good Player sees the edge in any Game.
Dorian Gray (movie)

Seeker and Hidden

Seeker and Hidden are located on the side surface of the transparent Cylinder ($n = 3/2$, $R = 1$ m) on the same plane perpendicular to the Cylinder axis and never leave it.

1. *(1 point)* Determine the probability that at a random location on the Cylinder the Seeker sees the Hidden.

Seeker and Hidden are located on the diametrically opposite points of the Cylinder. In order to continue The Game, Seeker moves away from the Cylinder in a straight line that goes through Hidden.

2. *(2 points)* Approximately plot the dependence of the images that Seeker sees on the distance between him and the axis of the Cylinder.

3. *(4 points)* Seeker is positioned to be as close as possible to the Cylinder, but to see the maximum number of Hidden's copies. What is the distance from Seeker to the axis of the Cylinder?

4. *(3 points)* What is the minimum Path Hidden should make to the Cylinder surface in order to be unseen?

All numerical answers should be given with an accuracy not less than 5%.

First hint — 02.05.2022 14:00 (Moscow time)
Second hint — 04.05.2022 14:00 (Moscow time)

Final of the third round — 06.05.2022 22:00 (Moscow time)