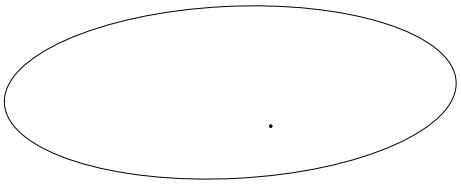
Physics Cup 2017 - Problem 4. 15th May 2017

Ellips depicted in the figure below represents a real image of a circle, created by an ideal thin lens. The dot inside it depicts the image of the center of the circle. Both the ellips and the main optical axis of the lens lay in the plane of the figure. Reconstruct the position of the lens (ie. the position of the centre and the orientation).

Remark: you need to copy the ellips onto a sheet of paper and find there the position of the lens, eg. by using geometrical constructions. Alternatively, you can use Geogebra, https://www.geogebra.org/.



Hints: Read through the solutions of the Problem No 7 of Physics Cup-2012, http://www.ipho2012.ee/physicscup/problem-no-7/solution/.

Further hints: draw two arbitrary lines through the image of the circle's centre and study the quadrilateral formed by the intersection points of these lines with the ellipse.

Results thus far (by the order of submission):
Marco Malandrone: 2.5937
Dylan Toh: 2.3579
Matias Arola: 2.1436
Siddharth Tiwary: 1.9487
Kaarel Hänni: 1.7716
Reinis Irmejs: 1.6105
Diogo Netto: 1.4641
Richard Luhtaru: 1.3310
Kaarel Kivisalu: 1.2100
Gabriel Golfetti: 1.100
Victor Almeida Ivo: 1.000

Non-official participants (by the order of submission):
Taavet Kalda: 2.5937

Results thus far (total for Pr 1 — Pr 3):
Marco Malandrone: 9.2993
Siddharth Tiwary: 8.8296
Diogo Netto: 6.8256
Kaarel Hänni: 6.2752
Victor Almeida Ivo: 5.5520
Akihiro Watanabe: 5.2021
Gabriel Golfetti: 5.1051
Dylan Toh: 4.3067
Matias Arola: 2.1436
Elvinas Ribinskas: 1.9487
Faizal Husni: 1.7716
Elene Kravishvili: 1.7716
Jacob Teo: 1.6105
Richard Luhtaru: 1.3310
Kaarel Kivisalu: 1.2100

Non-official participants (by the order of submission):
Taavet Kalda: 9.2389
Reinis Irmejs: 1.6105