

**Optics 463 — Homework 7 - Gaussian beams
due Tuesday, November 6, 2018**

1 Plano-convex lens

Consider the plano-convex lens sketched in Fig. 1. The lens index is $n = 2$. Its thickness is $d = 1$ cm, and the radius of curvature of the curved surface is $R = 1$ cm. A collimated beam is sent through the plane face. Find the focal distance x using geometrical optics.

Next consider the beam to be a Gaussian of $w_0 = 100\mu\text{m}$ incident on the plane surface, wavelength $1\ \mu\text{m}$. Find the location x of the beam waist (don't bother calculating the size).

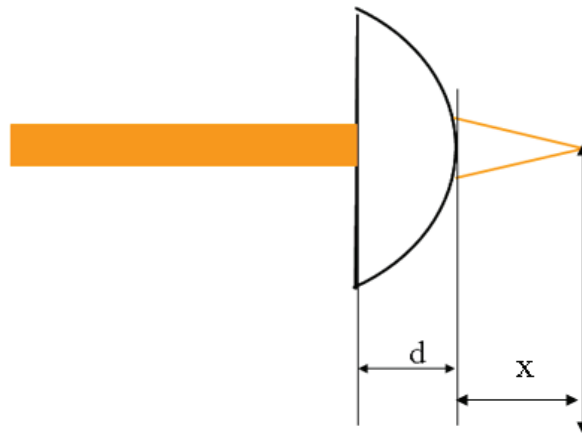


Figure 1:

2 Focusing problem: is the waist dependent of the index of the medium traversed?

Consider the sequence lens-air-interface glass-air, length of glass L , terminated by an interface glass-air at the focus. Find the dependence of the focal spot size and intensity on the index of the glass.