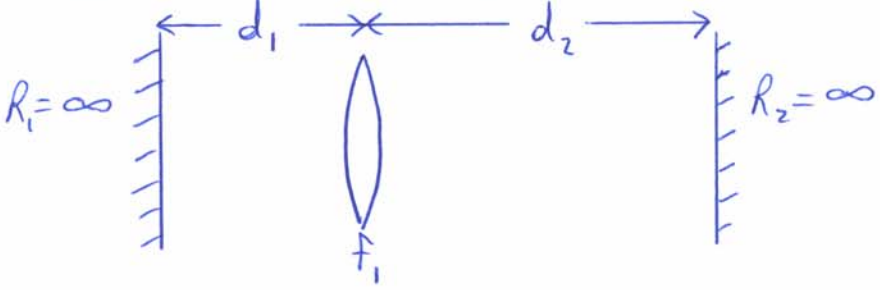
Assignment 2

1. Derive the matrix for the spherical mirror.

i.e. Show $\begin{pmatrix} A & B \\ C & D \end{pmatrix} = \begin{pmatrix} 1 & 0 \\ -\frac{2}{R} & 1 \end{pmatrix}$

2. Consider the cavity shown in the figure below.



a) Construct an equivalent lens waveguide.

b) Indicate a unit cell starting at a flat mirror, R_1

c) Find the ray matrix for the unit cell of 2b

d) Discuss the stability of this cavity.

3. Typical parameters of a glass fiber are:

Radius = 20 μm,. $n_o = 1.5$ and $\Delta n = 8 \times 10^{-3}$

How many times would a ray cross the axis of a fiber 1 km long?