**How to determine the refractive index of a semi disc?**

**First method**

Draw a straight line and fixe the semi disc like in figure 1.



Look at the line through the curved face of the semi disk and mark on it with a pencil the limit of the dark region, corresponding to the maximum refraction angle.

Put the semi disk like in the figure 2 and determine the limit angle of refraction.

Now you can calculate the refractive index of the semi disc:

$$n=\frac{1}{sinl}$$

**Second method**

The classical method is to use a pointer and a graph paper. You can determine the values of sini and sinr by measuring the distances (see figure 3).

In this case the refractive index is:

$$n=\frac{AA\_{1}\*IB}{AI\*BB\_{1}}$$

**Third method**

Draw a straight line and fixe the semi disc like in figure 1.

Shift the semi disc to the drawn line with a distance a like in figure 4.

b

a

I

i

r

You’ll see the image of the line shifted with the distance b. The I point has to be collinear with the image and your position of observation.

In this case:

$$n=\frac{sinr}{sini}=\frac{b\sqrt{a^{2}+R^{2}}}{a\sqrt{b^{2}+R^{2}}}$$