PHY 122/124 EXPERIMENT 8: Reflection, Refraction and Images- Worksheet

Part I: The Laws of Reflection and Refraction:

1. The Law of Reflection:

The angle of incidence on boundary 1 with its estimated error is _____.

The angle of reflection with its estimated error is _____.

Are these two angles equal within error?_____.

2. Snell's Law:

The angle of refraction on boundary 1 is _____
The index of refraction for boundary 1 is (show working):

_____

The angle of refraction on boundary 3 is _____
The index of refraction for boundary 3 is (show working):

_____ _____

3. Dispersion: qualitative only

Which color is bent more, red or blue? Which light has the larger index of refraction, red or blue light (hint: Look at Snell's Law)?

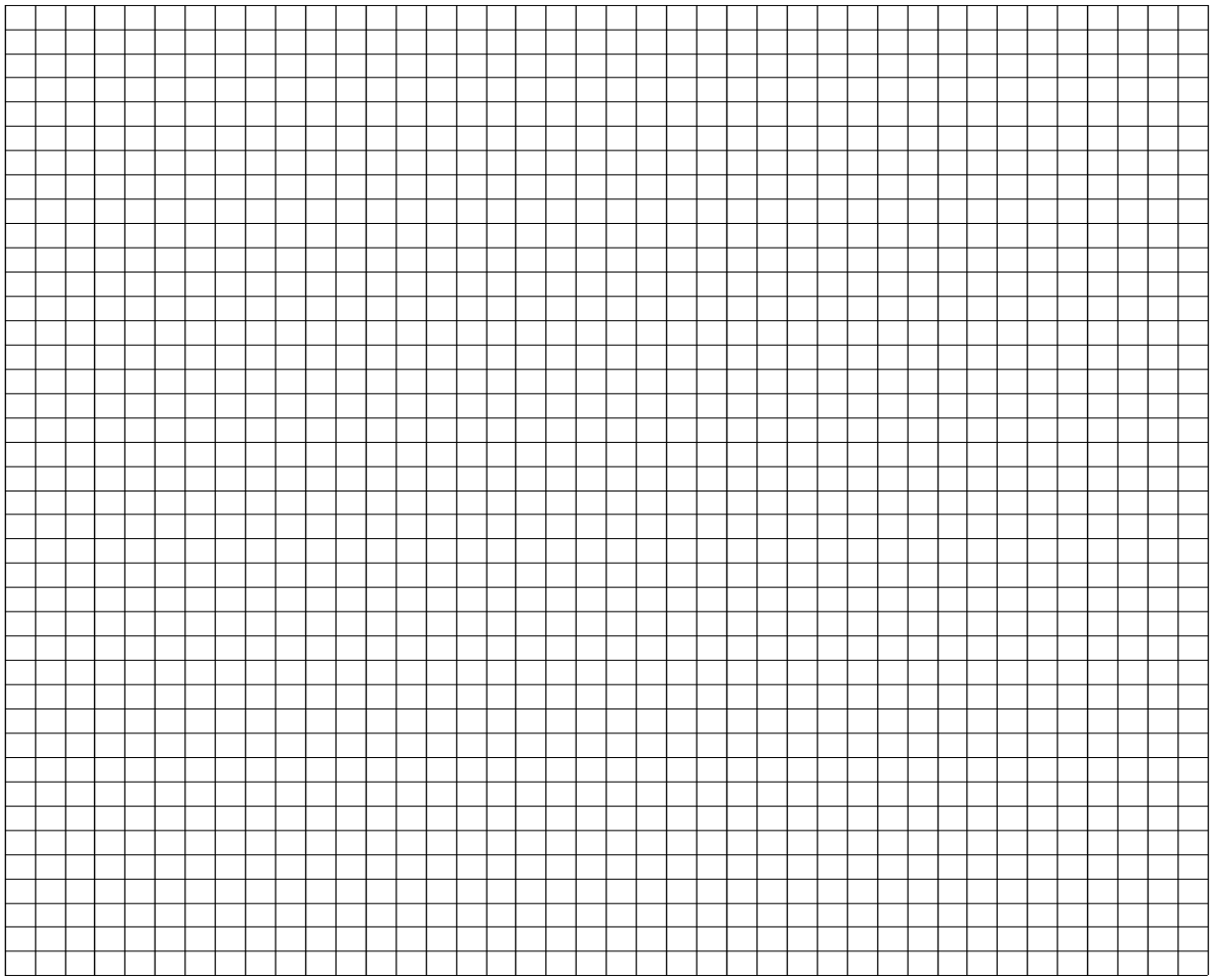
4. Total Internal Reflection: qualitative only

Describe your observations of the intensity of the beam emanating from boundary 2 as you rotate the prism. When the "exit ray" in Fig 2 disappears, is the intensity of the beam emanating from boundary 2 maximal or minimal? On which boundary do you observe total internal reflection?

Part II: The Imaging Laws for Lenses:
Focal length and Magnification for a 5 *cm* converging (#4 marked on bottom of shaft) lens

Measured data:

Object distance o ± error [ ]	Image distance i ± error [ ]	Object size h_o ± error [ ]	Image size h_i ± error [ ]	Object Orientation	Image Orientation



Focal length calculated from equation (7.3) _____+/-_____

Magnification calculated from sizes of object and image_____+/-_____

Magnification calculated from distances of object and image_____+/-_____

<u>Magnification for a 5 *cm* converging (#4 marked on bottom of shaft) lens at a different position</u> : (**<u>no errors needed here</u>**)

Measured data:

Object distance *o* [ ]	Image distance *i* [ ]	Object size h_o [ ]	Image size h_i [ ]	Object Orientation	Image Orientation

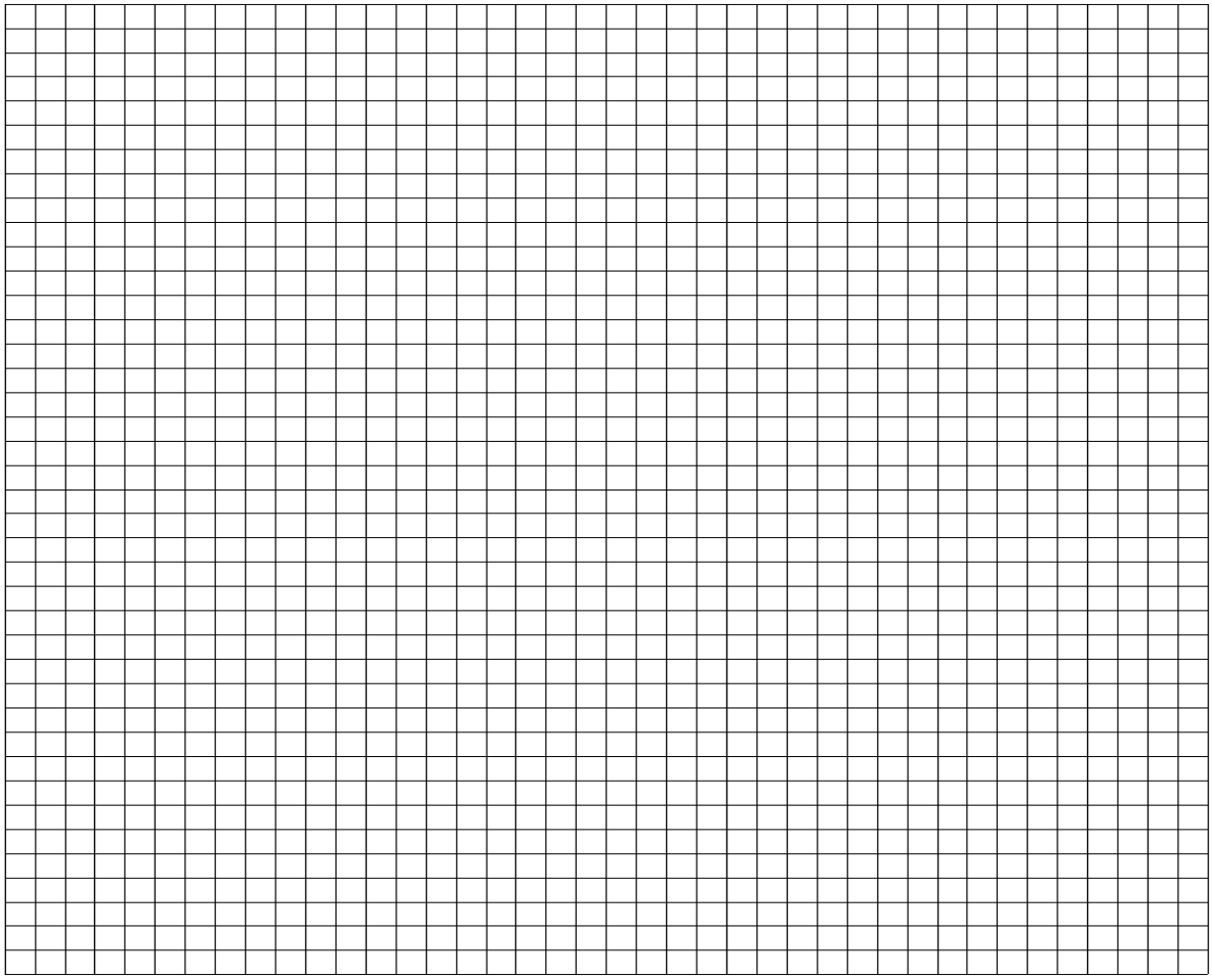


Image and Magnification for the 10 cm Diverging (#3 marked on bottom of shaft) Lens:

Is the image upright or inverted with respect to the original object?

Is the image magnified or demagnified with respect to the original object?

Slide the lens away from the object and state whether the properties of the image, apart from the size, change as you increase the distance of the lens from the object., i.e. is the image for any object distance upright/inverted, magnified/demagnified or do these characteristics change with object distance?

Is the image real or virtual?