name_____

ID# _____

Experiment 9

Converging and Diverging Lenses

Distant Object

Position of lens _____ **Position of Image** _____

Object distance _____ **Image distance** _____

Focal length of lens = _____

Characterize the image:

Show calculation:

Nearby object

Position of object _____ **Position of lens** _____

Position of Image _____

Object distance _____ **Image distance** _____

Size of object (*h*) _____ **Size of image (h_i)** _____

Characterize the image:

Focal length of lens _____

$m = \frac{-d_i}{d_o}$ = _____ $m = \frac{h_i}{h_o}$ = _____

% difference=_____

Show equations and sample calculations:

Method of coincidence

Position of object/mirror _____ Position of lens _____

Size of object (h_o) _____ Size of image (h_i) _____

Characterize the image:

Object distance _____ Image distance _____

Focal length of lens _____

$m = \frac{-d_i}{d_o}$ = _____ $m = \frac{h_i}{h_o}$ = _____

% difference=_____

Show equations and sample calculations:

Parallax method for converging lens

Position of object pin _____ Position of image pin _____

Position of lens _____

Characterize the image

Object distance _____ Image distance _____

Focal length _____

Show equations and sample calculations:

Parallax method for diverging lens

Position of object pin _____ Position of image pin _____

Position of lens _____

Characterize the image

Object distance _____ Image distance _____

Focal length _____
(10 points)

Lenses don't have exactly the same focal length for all wavelengths of light. Why? What problems could this cause for someone who is trying to design a camera or a telescope? Would you have the same problem with a mirror?

Questions

1. How did the four values of *f* for the converging lens compare? Do you think one particular method of finding the focal length was more accurate? Do you think one or more methods might be less accurate? Explain your conclusions. **(4 points)**

2. What did you notice about the image distance as you changed the object distance? What happened to the image as the object got farther away from the converging lens? **(3 points)**

3. What was the magnification of the image that you got using the method of coincidence? Why would you expect to get this value? **(3 points)**

4. Both converging and diverging lenses can be used to get a virtual image. What is the difference between the relative positions of the object and image for the converging and diverging lens? **(4 points)**