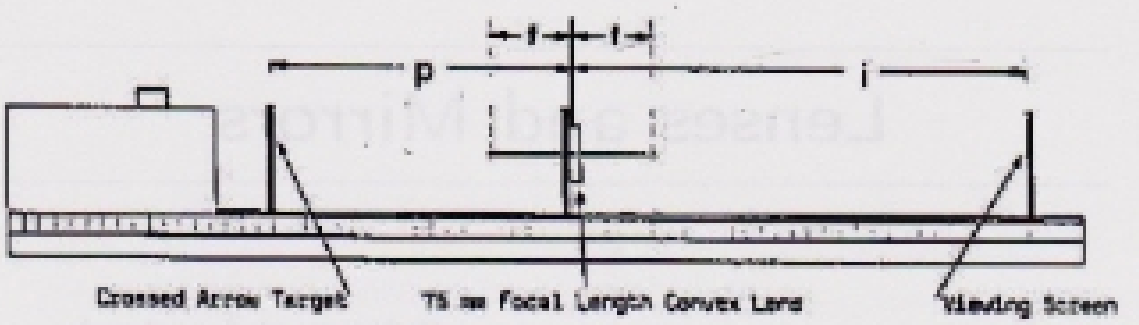
In this experiment, you will have an opportunity to test and apply these important equations.



Equipment Setup

Part I Converging Lenses

You will need:

- Optics bench
- Light source
- Convex lens (75 mm focal length)
- Crossed arrow target
- 3 Component holders
- Viewing screen

On a screen = real

Activity 1.1 Converging Lenses

1. Set up the equipment as shown in the previous figure. Turn on the Light Source and slide the lens toward or away from the Crossed Arrow Target, as needed to focus the image of the Target onto the Viewing Screen.
2. Is the image magnified or reduced?

When lens is moved toward object, it magnifies & opposite happens when it moves away

3. Is the image inverted?

Yes

4. Based on the Fundamental Lens Equation, what would happen to i if you increased p even further?

it would decrease

5. Measure the focal length of the lens.

75 mm

6. Now set p to the values listed in the table below. At each setting, measure i and h_i. You'll also need to measure h_o, the height of the object (h_o is the height of the arrow on the crossed arrow target). If the image is inverted, make sure you label h_i/h_o as negative. Using the data you have collected, perform the calculations shown in the table.

(All lengths in mm) 2cm

p	i	h_i	$1/i+1/p$	f mm	h_i/h_o	$-i/p$
400	90	0.3	0.0136	73.5	.25	-0.25
300	100	0.5	0.0133	75	.275	-0.33
200	120	1.1	0.0133	75	.55	-0.6
100	300	0.3	0.0133	75	3.15	-3
75			0.0133	75		
50			0.0133	75		

7. Are your results in complete agreement with the Fundamental Lens Equation? If not, to what to you attribute the discrepancies?

Yes

8. For what values of p were you unable to focus an image onto the screen? Use the Fundamental Lens Equation to explain why.

So because its virtual

9. If the object is at ∞ where is the image? If the object is at f where is the image?

everywhere, ∞

10. If the object is closer then f where is the image? Is it real or virtual?

virtual

$-p - p$

11. For a lens of focal length f, what value of p would give an image with a magnification of one? Find the answer in terms of f.

$M = -\frac{i}{p}$

$\frac{1}{f} = 0$

$f = \infty$

$M = \frac{i}{p}\left(\frac{1}{f} = \frac{1}{p} + \frac{1}{i}\right)$

$pi = fi + fp$

$pi = f(i+p)$

$\frac{i+p}{}$ $f = \frac{pi}{i+p}$