

#### 4. Converging Mirror – Distant Object

- Mount the concave mirror on one end of the optics bench, on the side away from the distant object you used for the converging lens.
- Using an index card, find the image of the distant object. In order not to block the light, position the bench at a slight angle. The image will form slightly to the side of the bench.
- Record the object, image and mirror positions. Calculate and record the object and image distances and the focal length.
- Calculate the radius of curvature  $R$  of the mirror.
- Characterize the image as real or virtual, upright or inverted, enlarged or reduced.

#### 5. Converging Mirror – Nearby Object.

- Slide the object lamp onto the optics bench on the side away from the mirror. Plug the adaptor into an AC outlet and into the lamp. Tilt the lamp so that the arrows point toward the mirror.
- Position the object lamp outside the radius of curvature of the mirror.
- Find the image using the index card. Record the object, image and mirror positions and calculate the object and image distances.
- Measure one of the arrows on the object lamp and measure the corresponding arrow on the image.
- Calculate the focal length using the thin lens equation. Take the percent difference between the two methods for finding the focal length.
- Calculate the magnification using both formulas (2 and 3 above). Find the percent difference between them.
- Characterize the image as real or virtual, upright or inverted, enlarged or reduced.

### Data & Analysis: Lenses & Mirrors

#### 2. Converging lens – nearby object

##### a) First image

Position			Distance		Focal length	% diff
Object	Lens	Image	Object	Image		

Image Size	Object Size

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<b>Magnification</b>		<b>% diff</b>
By height	By distance	

Characterize the image:

## Data & Analysis: Lenses & Mirrors

### b) Second image

Position			Distance		Focal length	% diff
Object	Lens	Image	Object	Image		

Image Size	Object Size

Magnification		% diff
By height	By distance	

Characterize the image:

## Data & Analysis: Lenses & Mirrors

### 3. Converging lens – object inside focal point

Position			Distance		Focal length	% diff
Object	Lens	Image	Object	Image		

Magnification		% diff
Estimate	By formula	

Characterize the image:

### 4. Converging Mirror – distant object

Position			Distance		Focal length	Radius (R)
Object	Lens	Image	Object	Image		

Characterize the image:

## Data & Analysis: Lenses & Mirrors

### 5. Converging mirror – nearby object

Position			Distance		Focal length	% diff
Object	Lens	Image	Object	Image		

Magnification		% diff
By height	By distance	

Characterize the image: