Geometric Optics Notes (mirrors)

There are several definitions which are important to understand geometrical optics. The magnification is still defined by

$$M \equiv \frac{h'}{h} = -\frac{s'}{s}$$

M>0: image is ***upright.*** M<0: image is ***inverted.***

The ultimate equation which is important for understanding mirrors is called the **Mirror equation:**

$$\frac{1}{s} + \frac{1}{s'} = \frac{1}{f}$$

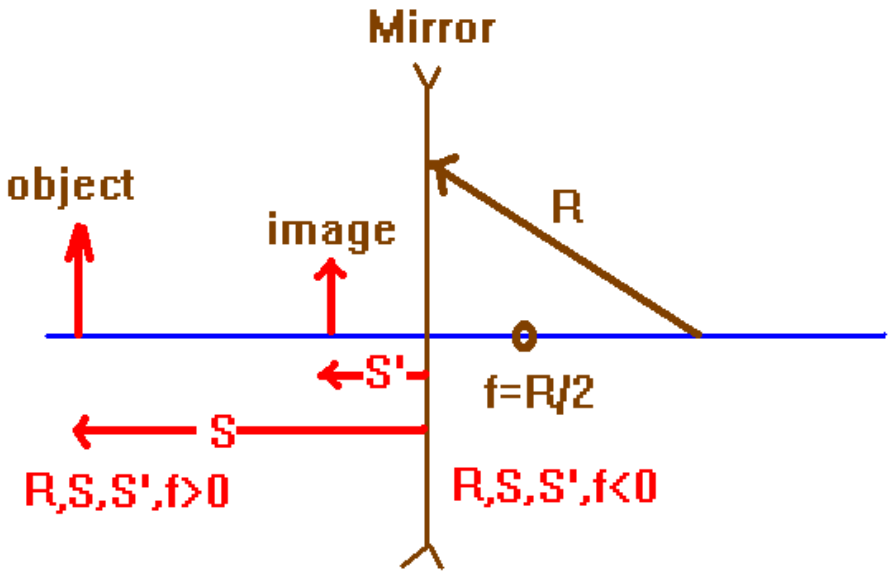
which we will later show comes about by direct application of the law of reflection:

$$\theta_i = \theta_r$$

Here, the image distance is s', the object distance is s and the focal length is f. We will also later show that the focal length and the radius of curvature are related by:

$$f = \frac{R}{2}$$

The sign convention for the mirror **equation is different from that for lenses**:



One very important angle in reflection is the Brewster angle. In order to work with the Brewster angle, it is important to know the following two properties of light and the Brewster angle: (1) light has two components of polarization which are independent of each other and (2) When light is incident at the Brewster angle, the reflected light is completely polarized while the transmitted light makes an angle of 90^0 with respect to the reflected light. This says that the Brewster angle permits measurement of the index of refraction in a completely simple manner, which you will do in lab.