P9.W – Reflection and Refraction

1. Using a thin lens with a focal length of \( f = 5.2 \text{ cm} \), a student makes two measurements. They find the distance to the object to be \( o = 3.1 \text{ cm} \).

   a. At what distance \( i \) should they expect the image to be in focus?

   b. Is this a real or virtual image based on the sign convention?

   c. Find the magnification of the image. Again, use the appropriate sign convention.

2. Keeping the same configuration as in Problem 1, the student measures the image and object sizes. They find the object size is \( s_o = 2.5 \text{ cm} \) and the image size is \( s_i = 6.2 \text{ cm} \). What is the magnitude of the magnification \( |m| \) based on these measurements?

3. For the following equations, use the sign convention to answer the true or false questions.

   \[
   \frac{1}{i} = \frac{1}{f} - \frac{1}{o} < 0 \quad (1)
   \]

   a. The image is virtual.

   b. The image distance is positive.

   \[
   \frac{1}{i} = \frac{1}{f} - \frac{1}{o} > 0 \quad (2)
   \]

   a. The image is real.

   b. The image distance is positive.