P9.W  Light and Lenses

Please Show All Work!

1. Using a thin lens with a focal length of \( f = +5.2 \text{ cm} \), a student makes two measurements. She finds the distance to the object to be \( o = +3.1 \text{ cm} \). What distance, \( i \), should she expect for the image? Explain whether this is a real or virtual image using the sign convention. Then find the magnification of the image also explaining your answer using the sign convention.

2. Now, the student measures the image and object sizes with the lens, object and image at the same position as in Problem 1. She finds that the image size is \( s_i = 6.2 \text{ cm} \) and the object size is \( s_o = 2.5 \text{ cm} \). What is the magnitude \( |m| \) of the magnification using these measurements?

3. For the following equations, use the sign convention to determine statements a and b, by circling the correct word.

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

a. The image is real or virtual?

b. The image distance is negative or positive?

\[
\frac{1}{i} = \frac{1}{f} - \frac{1}{o} > 0
\]

a. The image is real or virtual?

b. The image distance is negative or positive?