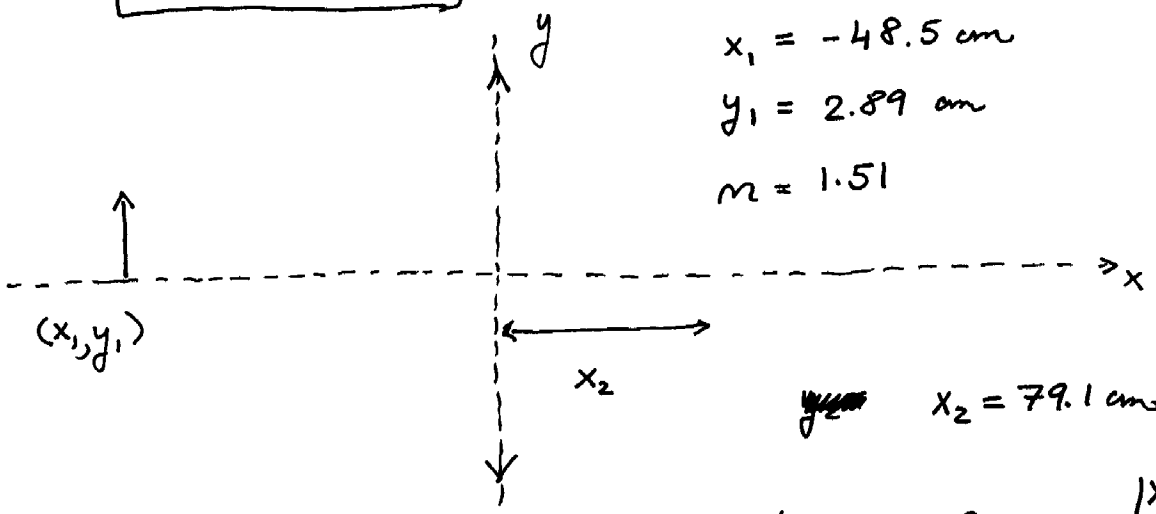
HW 26

(1)



$x_1 = -48.5\ cm$

$y_1 = 2.89\ cm$

$n = 1.51$

$x_2 = 79.1\ cm$

Thin lens equation: $\frac{1}{|x_1|} + \frac{1}{|x_2|} = \frac{1}{f_{lens}} \Rightarrow f_{lens} = \frac{|x_1||x_2|}{|x_1|+|x_2|}$

$f_{lens} \doteq \underline{30.07\ cm}$

(2) Magnification: $\frac{y_2}{y_1} = M = -\frac{i}{o} = -\frac{x_2}{|x_1|}$

$y_2 = -\left(\frac{x_2}{|x_1|}\right) \cdot y_1 \doteq \underline{-4.71\ cm}$

(3) $\frac{1}{f} = (n-1)\left(\frac{1}{R_1} - \frac{1}{R_2}\right) = \frac{n-1}{R_1} \Rightarrow R_1 = (n-1)\cdot f$

($R_2 = \infty$, planar)

$R_1 \doteq \underline{+15.3\ cm}$

(4) $\frac{1}{|x_1'|} + \frac{1}{x_2} = \frac{1}{f} \Rightarrow x_2 = \frac{f \cdot |x_1'|}{|x_1'| - f}$

$x_2 \doteq \underline{-66.43\ cm}$

(5) Virtual & Upright

Object is closer to the lens than focal point:

a) Rays don't intersect $\Rightarrow$ virtual

b) Upright (do ray tracing in order to see that)