EXAM 5

SHOW ALL WORK!!!!
REPORT ALL NUMBERS TO THREE SIGNIFICANT FIGURES!
Use the conversion constants and data given on the front page.

For the lens system shown, there is a real object 250 cm to the left of lens 1. You supply the sign for the focal lengths of the lenses.

\[ \frac{1}{f_1} + \frac{1}{q_1} = \frac{1}{f} \]
\[ p_1 = 250 \text{ cm} \]
\[ q_1 = \frac{1}{1000 \text{ cm}} - \frac{1}{250 \text{ cm}} \]
\[ q_1 = 1000 \text{ cm} \]
\[ p_2 = 300 \text{ cm} - 1000 \text{ cm} = -700 \text{ cm} \]
\[ \frac{1}{p_2} + \frac{1}{q_2} = \frac{1}{750 \text{ cm}} + \frac{1}{700 \text{ cm}} \]
\[ q_2 = \frac{10500 \text{ cm}}{750 \text{ cm}} \]
\[ q_2 = 14 \text{ cm to the right} \]

(a) Calculate the position, measured from the center of lens 2, of the final image (+ right, - left).

(b) Is the image erect or inverted?

(c) Is the image real or virtual?

(d) Calculate the magnification of the system.

\[ m = M_1 \cdot M_2 = \frac{q_1}{p_1} \cdot \frac{q_2}{p_2} = -60 \]

All or nothing unless sign is wrong on M.