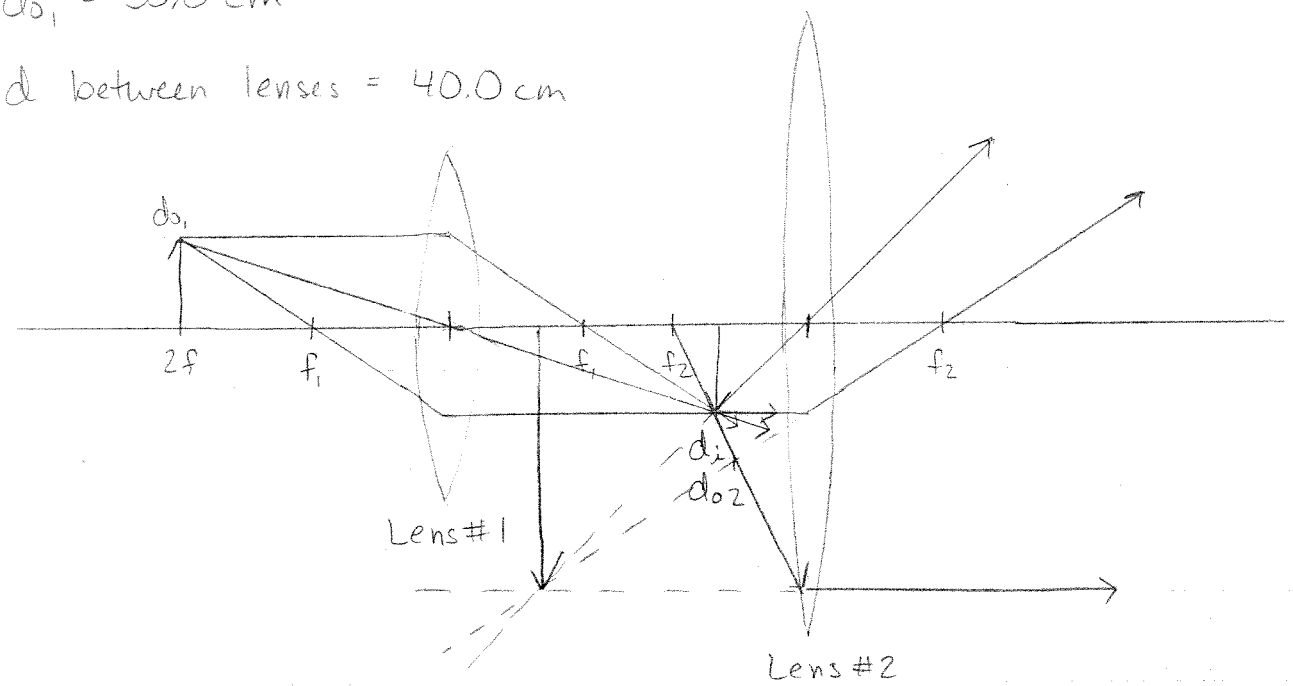
P #41 Ch 23 - pg 743

$f_1 = f_2 = 15.0$ cm

$d_{o_1} = 30.0$ cm

$d$ between lenses $= 40.0$ cm




Lens #1 $\quad \frac{1}{d_o} + \frac{1}{d_i} = \frac{1}{f}$

$(30\text{ cm})^{-1} + d_i^{-1} = (15\text{ cm})^{-1}$

$d_{i_1} = 30$ cm

$m = -\frac{d_i}{d_o}$

$= -\frac{(30\text{ cm})}{30\text{ cm}}$

$m_1 = -1$

Lens #2: $d_{o_2} = (40\text{ cm}) - (30\text{ cm}) = 10$ cm

$\frac{1}{d_o} + \frac{1}{d_i} = \frac{1}{f}$

$(10\text{ cm})^{-1} + d_i^{-1} = (15\text{ cm})^{-1}$

$d_{i_2} = -30$ cm

$m = \frac{-d_i}{d_o} = \frac{-(-30\text{ cm})}{10\text{ cm}}$

$m_2 = +3$

Final Image: $d_{i_2} = -30 = 30$ cm left of 2nd lens

$m = m_1 \cdot m_2 = (-1)(+3)$ $\boxed{m = -3}$

$\boxed{d_i = 10\text{ cm right of 1st lens}}$