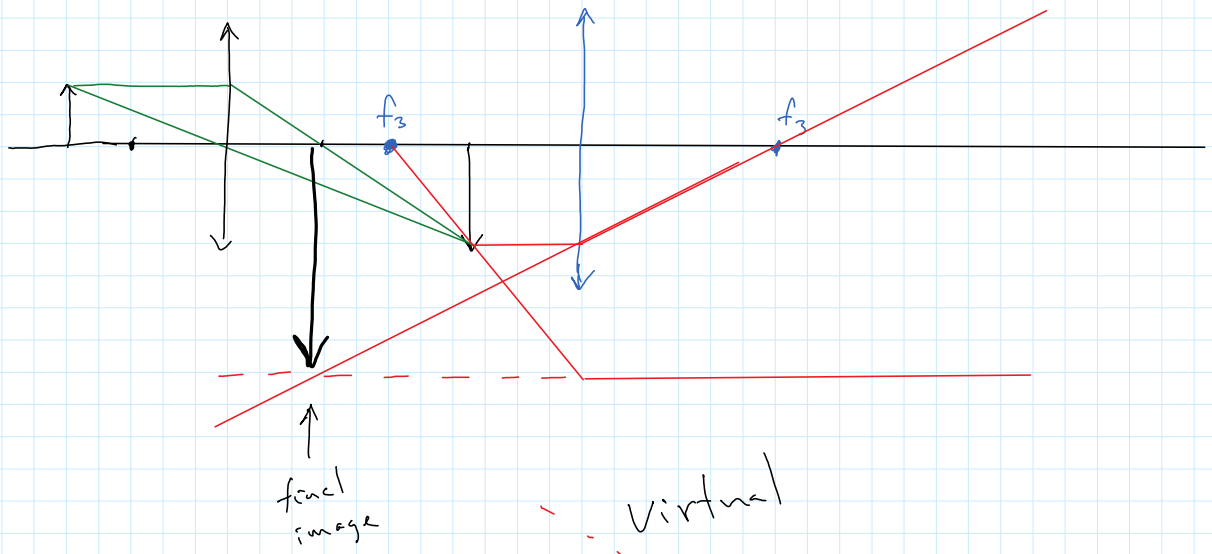
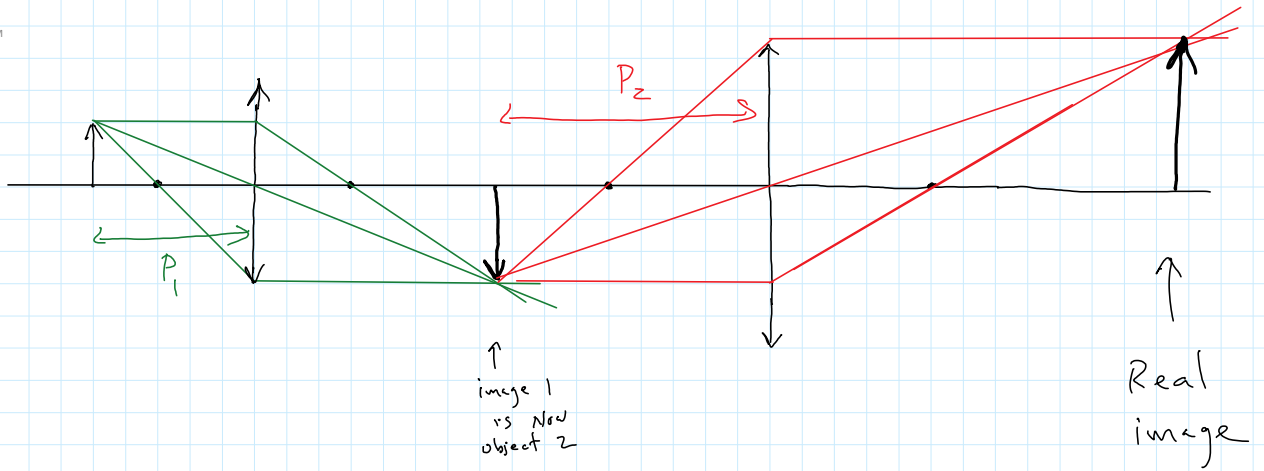
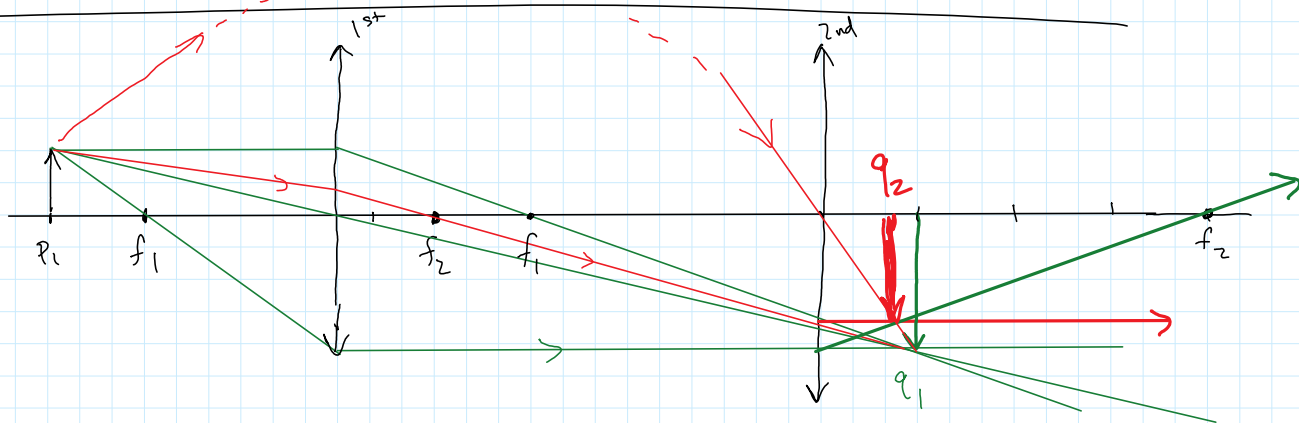


Worksheet
7. HW-140



problem



1st Lens : $f_1 = 20$ cm
 $P_1 = 30$ cm

2nd lens : $f_2 = 40$ cm

Distance between lenses = 50 cm

$$h = 2 \text{ cm}$$

Let's check with the equations:

1st lens: $\frac{1}{p} + \frac{1}{q} = \frac{1}{f}$

$$+\frac{1}{30} + \frac{1}{q} = \frac{1}{20}$$

$$q = 60 \text{ cm}$$

$$M = -\frac{60}{30} = -2$$

$$h' = 4 \text{ cm}$$

2nd lens: $p_2 = -10 \text{ cm}$

(10 cm on R+ side of lens 2)

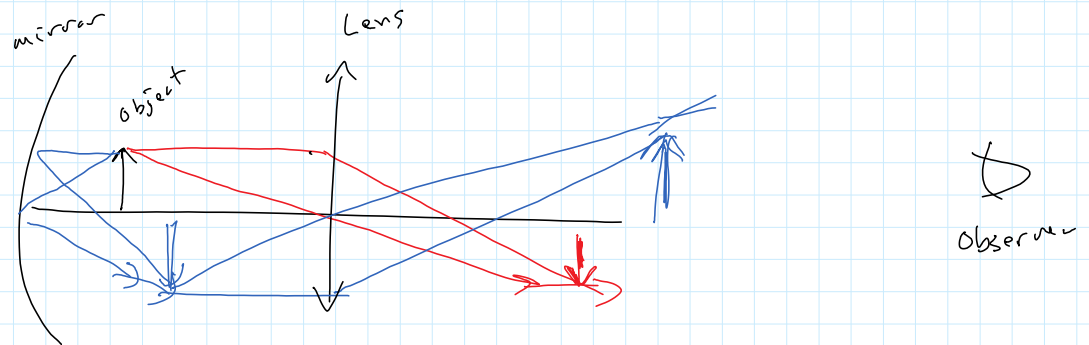
$$\frac{1}{p} + \frac{1}{q} = \frac{1}{f}$$

$$\frac{1}{-10} + \frac{1}{q} = \frac{1}{40}$$

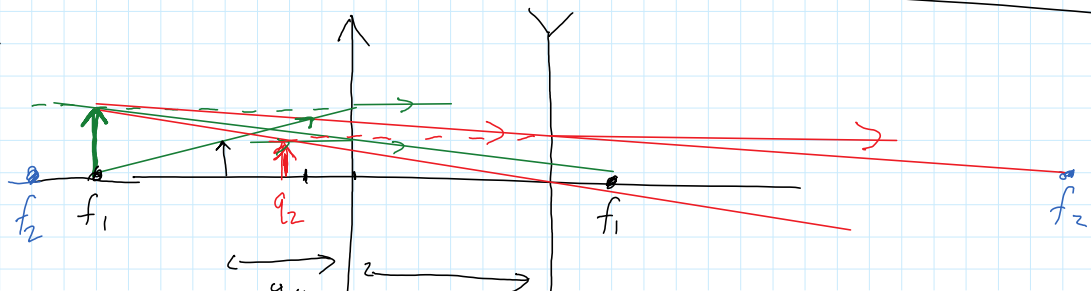
$$q = 8 \text{ cm}$$

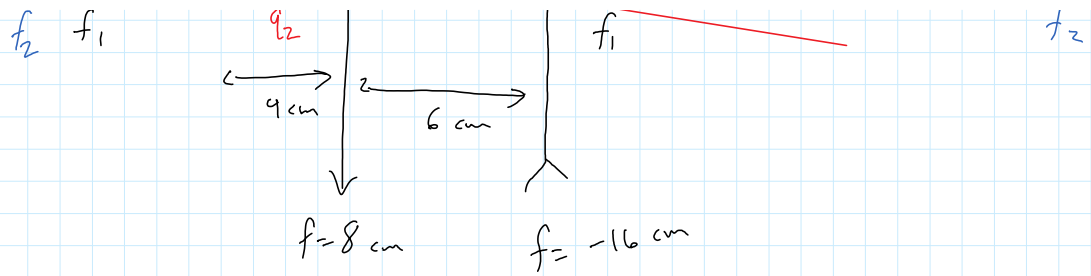
$$M_2 = -\frac{8}{-10} = +0.8$$

$$h'' = h' M = 3.2 \text{ cm}$$



Book Problem
36-53





$$h = 1 \text{ cm}$$

1st lens:

$$\frac{1}{p} + \frac{1}{q} = \frac{1}{f}$$

$$\frac{1}{4} + \frac{1}{q} = \frac{1}{8}$$

$$q = -8 \text{ cm}$$

↑
on left of lens

$$M = -\frac{q}{p} = -\frac{-8}{4} = +2$$

$$h' = 2 \text{ cm}$$

2nd lens:

$$\frac{1}{p} + \frac{1}{q} = \frac{1}{f}$$

$$p_2 = 14$$

$$\frac{1}{14} + \frac{1}{q} = \frac{1}{-16}$$

$$q = -7.47 \text{ cm}$$

$$M_2 = -\frac{q}{p} = -\frac{-7.47}{14} = -0.503$$