General Physics 204, Section ... Monday, Mar 30, 2015
Quiz #7 The Refraction of Light

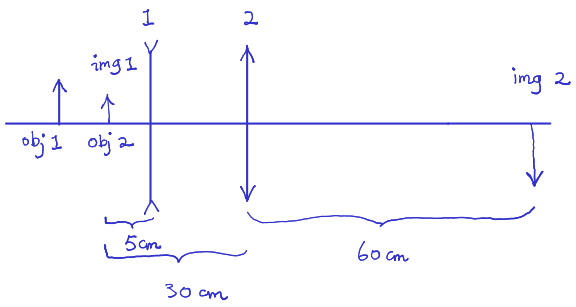
Name:

1) CLASS(2)
Aristophanes has a concave lens with focal length $f_1 = -10$ cm and a convex lens with focal length $f_2 = 20$ cm. He uses concave lens as the objective. The distance between the object and the concave lens is 10 cm and the distance between the final image (image for the convex lens) and the convex lens is 60 cm. What is the distance between the two lenses? **[5 pts]**

Concave lens: $\frac{1}{d_{o_1}} + \frac{1}{d_{i_1}} = \frac{1}{f_1}$ $\xrightarrow{d_{o_1} = 10\,cm}$ $d_{i_1} = -5\,cm$

Convex Lens: $\frac{1}{d_{o_2}} + \frac{1}{d_{i_2}} = \frac{1}{f_2}$ $\xrightarrow{d_{i_2} = 60\,cm}$ $d_{o_2} = 30\,cm$

$\rightarrow d = d_{i_1} + d_{o_2} = 25\,cm$



2) CLASS(2)
Hans Lippershey is farsighted and wears contacts. His uncorrected near point is 80 cm from his eye. Using the lens he can see objects as close as 25 cm. Looking at a painting, the contacts make an image at a distance 200 cm from her eyes. How far away the painting is hanging? **[5 pts]**

Contact lens: $\frac{1}{d_o} + \frac{1}{d_i} = \frac{1}{f} \rightarrow \frac{1}{25\,cm} + \frac{1}{-80\,cm} = \frac{1}{f} \rightarrow f = \frac{400}{11}$ cm.

painting: $\frac{1}{d_o} + \frac{1}{d_i} = \frac{1}{f} \rightarrow \frac{1}{d_o} + \frac{1}{-200\,cm} = \frac{11}{400\,cm} \rightarrow d_o = \frac{400}{13}$ cm.