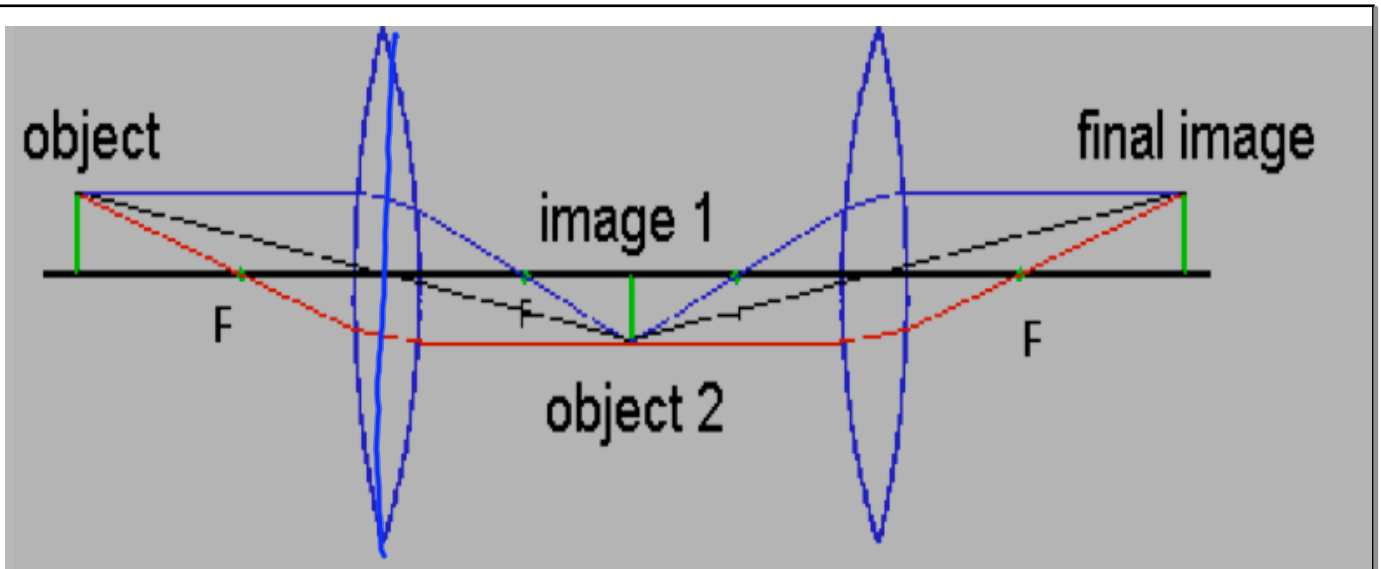
Reminders 03-31-08:

-Next Exam April 14, Chapters 33-36

Outline:

-Examples Involving Lenses
-Interference
-Young's Double Slit Experiment
-Thin Film Interference



Can you derive an equation for the effective focal length of the lens combination? What is s_i if f_1=10cm, f_2=15cm, d=40cm, and s_o=20cm?

$$\frac{1}{s_o} + \frac{1}{s_i} = \frac{1}{f} \qquad \frac{1}{s_i} = \frac{1}{f} - \frac{1}{s_o}$$

$$\frac{1}{s_i} = \frac{1}{10\,cm} - \frac{1}{20} = \frac{1}{20\,cm} \qquad s_i = 20\,cm$$

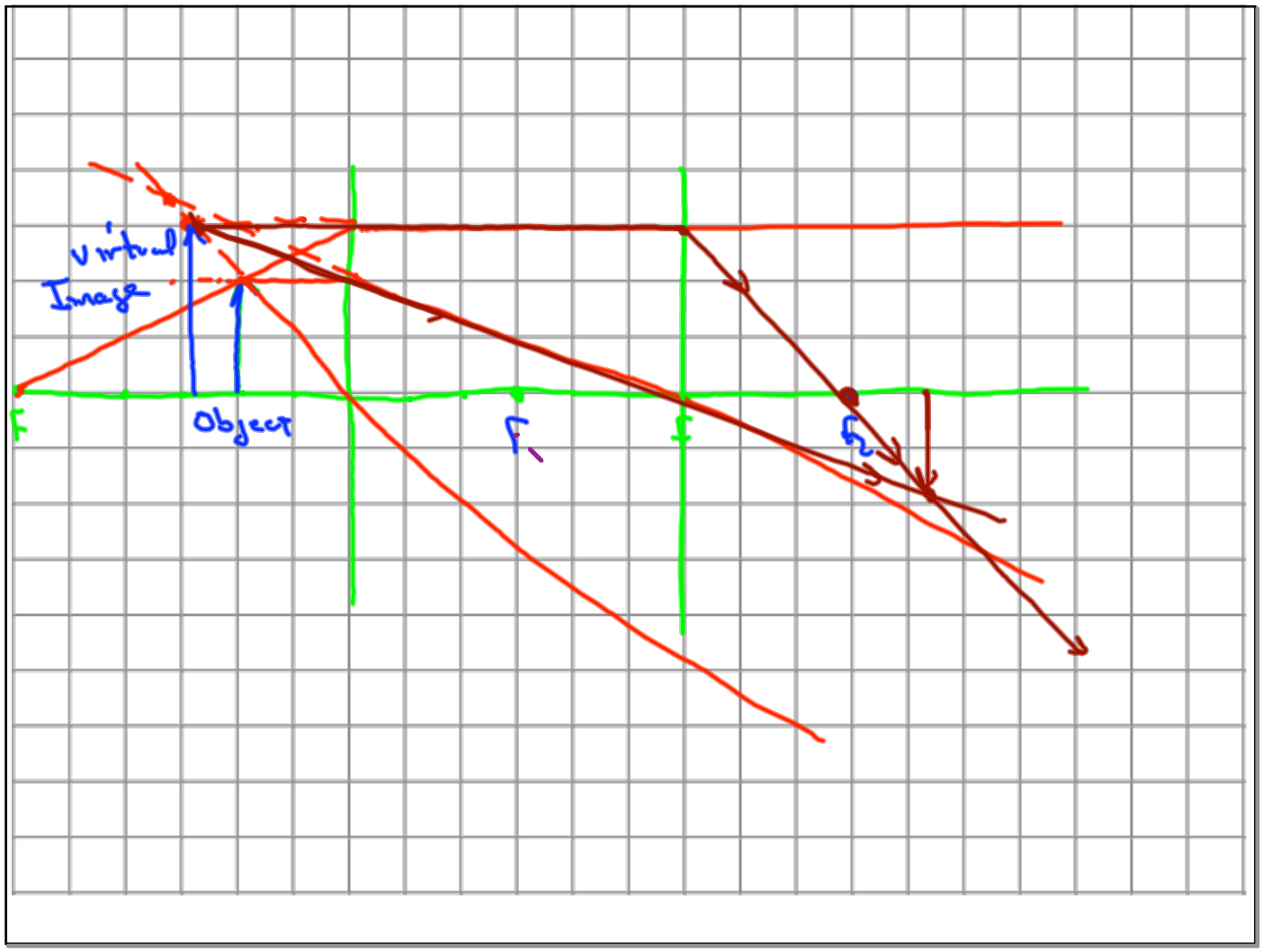
$$\frac{1}{s_{i_2}} = \frac{1}{f} - \frac{1}{20} = \frac{1}{15\,cm} - \frac{1}{20} = \frac{4}{60} - \frac{3}{60}$$

$$s_{i_2} = 60\,cm$$

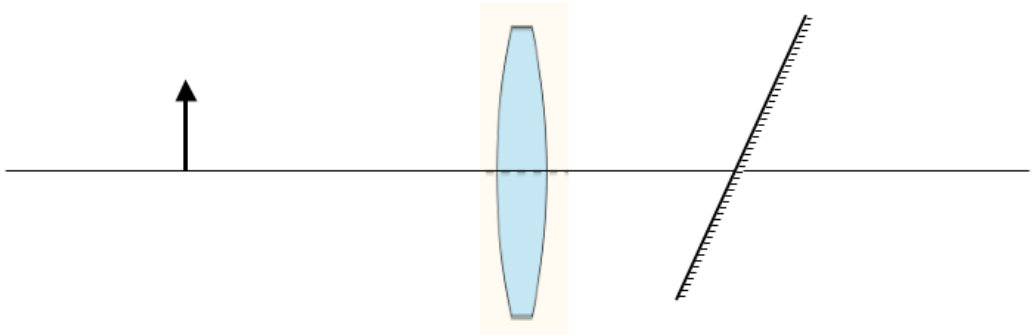
- An object is placed 4.0cm to the left of a double convex lens of focal length f=12.0cm. Determine the location of the image. Is it real?
- A second lens of focal length f_2=6.0cm is placed 12.0cm to the right of the first lens. Determine the location of the image. Is it real? Draw a ray tracing diagram of the system.

$\frac{1}{s_i} = \frac{1}{f} - \frac{1}{s_o} = \frac{1}{12} - \frac{1}{4} = \frac{-2}{12}$ $s_i = -6cm$

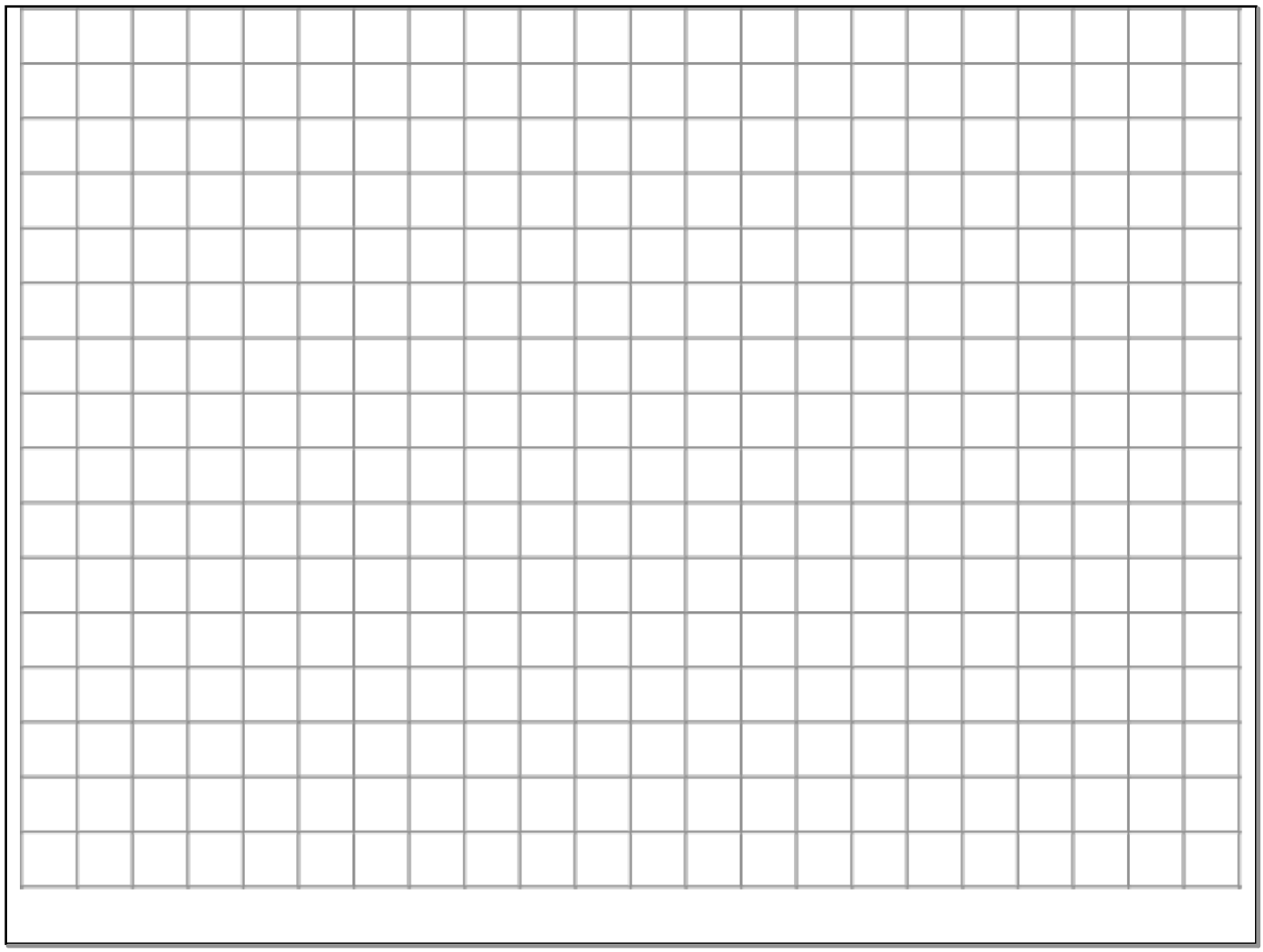
$\frac{1}{s_i} = \frac{1}{6} - \frac{1}{18} = \frac{2}{18}$ $s_i = 9cm$


Virtual
Image
Object
F
F
f
2f

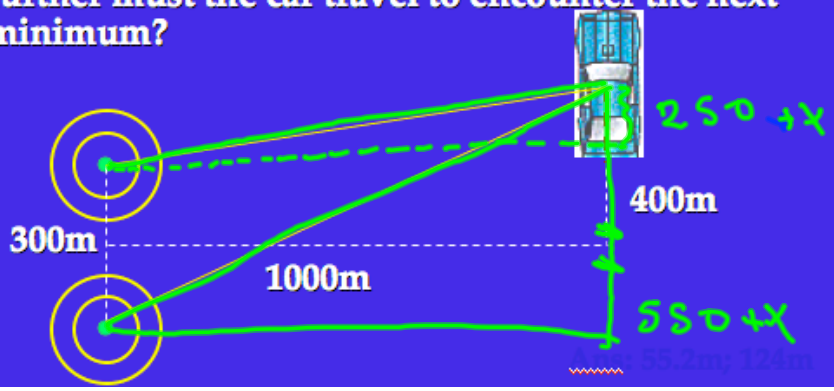
An object is placed 15 cm from a biconvex lens of focal length 10 cm. A plane mirror oriented at 45° with respect to the horizontal is placed 15 cm to the right of the lens. Draw a ray diagram (to scale) indicating the location of the final image.



The image of the object in an magnifying glass cannot be Projected directly onto a screen. However when you can see the Image of the object when you view the image through the lens. Why is this so?



- Two radio antennas separated by 300m as shown below broadcast identical signals at the same wavelengths. A car traveling due north receives the signals. If the car is at the second maximum what is the wavelength of the signal? How much further must the car travel to encounter the next minimum?



Need to figure out λ

$$\sqrt{(1000)^2 + (550)^2} - \sqrt{(1000)^2 + (250)^2} = \lambda$$

$$\lambda = 55.2\text{m}$$

$$\sqrt{(1000)^2 + (550+x)^2} - \sqrt{(1000)^2 + (250+x)^2} = \frac{3\lambda}{2}$$

$$x = 124\text{ m}$$