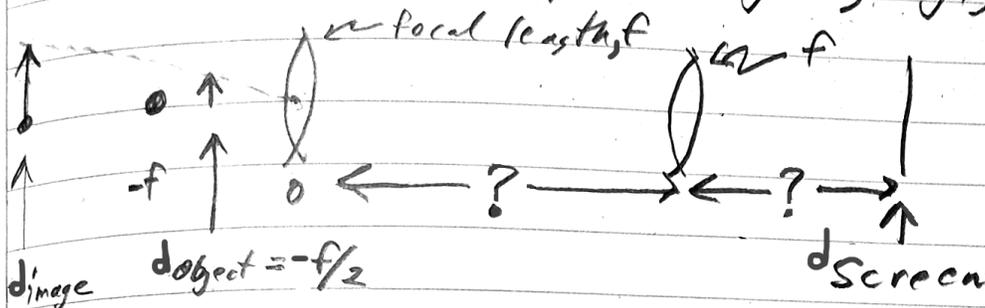If the object is placed closer than one focal length in front of a converging lens, the image is projected on the same side of the object, e.g., for $d_o = f/2$:

(1) What is d_{image}?

(2) What is the magnification?

(3) Where could you put a second lens with focal length f, and where should you then place a screen, to image the original object with total magnification $M = -1$.

4) What is the Fourier transform of a Gaussian

$$f(x) = \frac{1}{\sqrt{2\pi\sigma^2}} e^{-x^2/2\sigma^2}$$

The trick is to "complete the square" in the integral.