

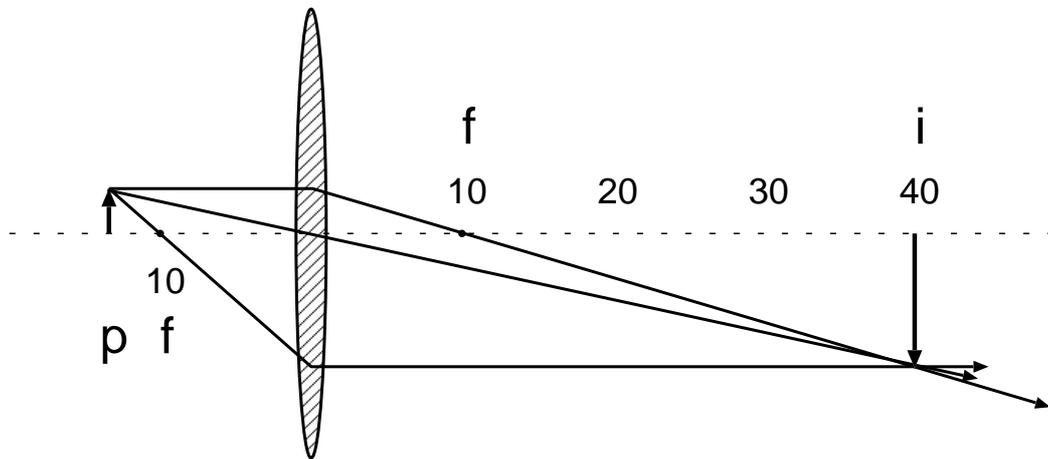
Physics 223

Experiment 5: Focal Length of Lenses

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When an object is placed at a distance p from a convex lens with focal length f , then if $p > f$, a **real** image is formed at some distance i away from the lens (see the Figure below). For $p < f$, a **virtual** image is formed where i is negative. These two kinds of images differ in that a real image can be focused onto a screen, whereas as a virtual image cannot. For a lens which is thin compared with the distances p , i , and f , the relationship between these quantities is given by the thin lens equation:

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



The lateral magnification of the lens (the size of the image relative to the object) is given by:

$$m = -\frac{i}{p}$$

If the image is real ($i > 0$), as in the figure, the resulting magnification is negative, meaning that the image is inverted with respect to the object.

You will be provided a high intensity lamp source, a white screen, an optical rail, a meter stick, and 3 lenses, marked **A**, **B**, and **C**. Devise a procedure to determine the focal length of each of the lenses.