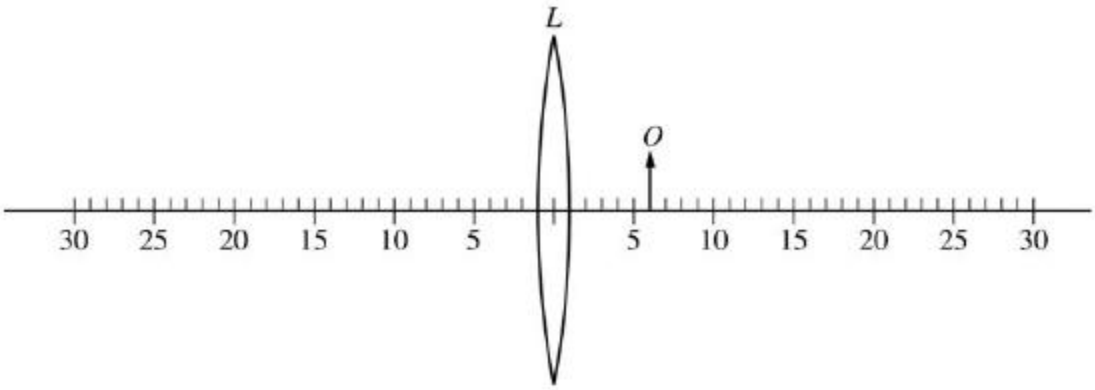
Name:_____ Date:_____

AP 2 Optics: Lens Worksheet 4

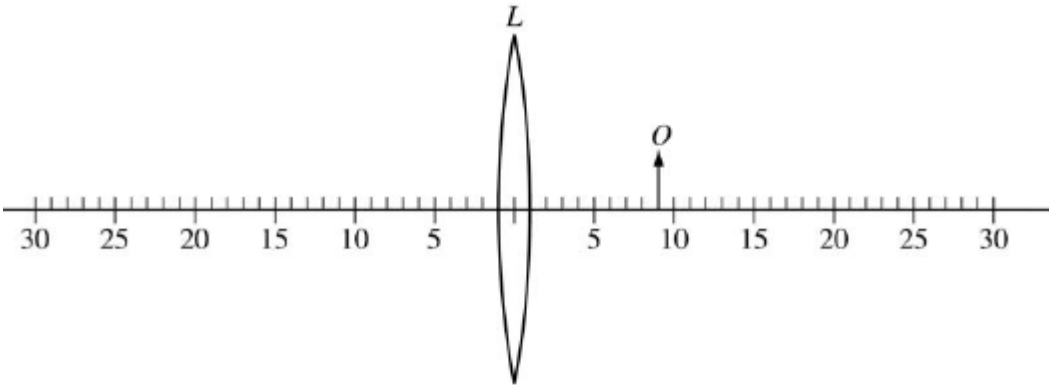
1. A thin converging lens *L* of focal length 10.0 cm is used as a simple magnifier to examine an object *O* that is placed 6.0 cm from the lens.



(a) On the figure above, draw a ray diagram showing at least two incident rays and the position and size of the image formed.

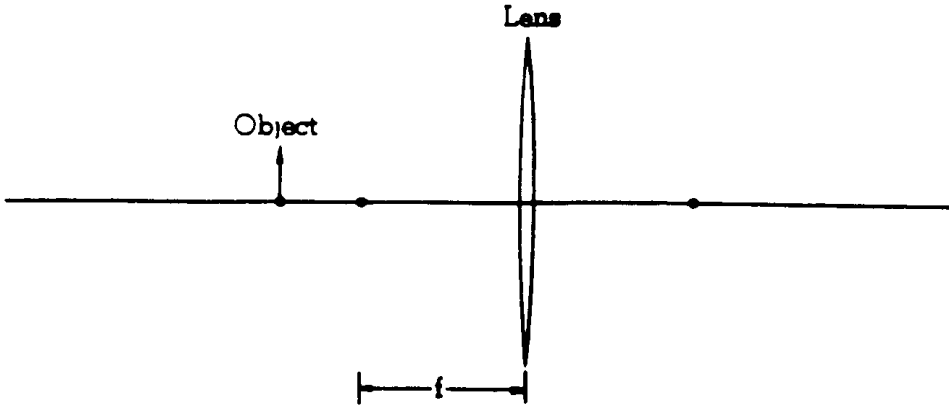
(b) i. Indicate whether the image is real or virtual.
____ Real ____ Virtual
ii. Justify your answer.

(c) Calculate the distance of the image from the center of the lens. (Do NOT simply measure your ray diagram.)



(d) The object is now moved 3.0 cm to the right, as shown above. How does the height of the new image compare with that of the previous image?
____ It is larger. ____ It is smaller. ____ It is the same size.
Justify your answer.

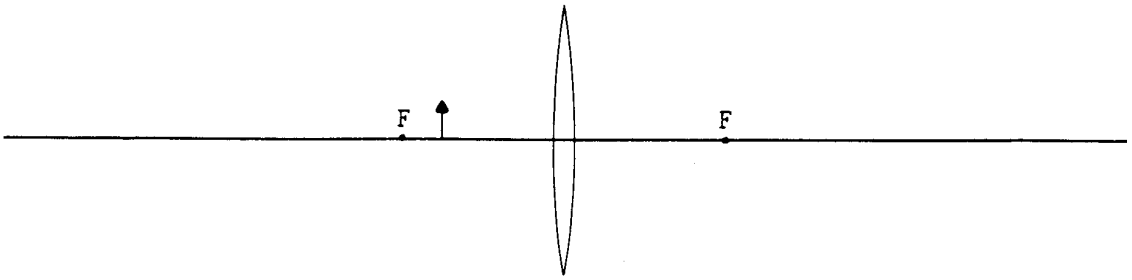
2. An object is located a distance 3/2 f from a thin converging lens of focal length f as shown in the diagram below.



a. Calculate the position of the image.

b. Trace two of the principal rays to verify the position of the image.

c. Suppose the object remains fixed and the lens is removed. Another converging lens of focal length f_2 is placed in exactly the same position as the first lens. A new real image larger than the first is now formed. Must the focal length of the second lens be greater or less than f ? Justify your answer



3. An object of height 1 centimeter is placed 6 centimeters to the left of a converging lens whose focal length is 8 centimeters, as shown on the diagram above.

(a) Calculate the position of the image. Is it to the left or right of the lens? Is it real or virtual?

(b) Calculate the size of the image. Is it upright or inverted?

(c) On the diagram, locate the image by ray tracing.

(d) What simple optical instrument uses this sort of object-image relationship?