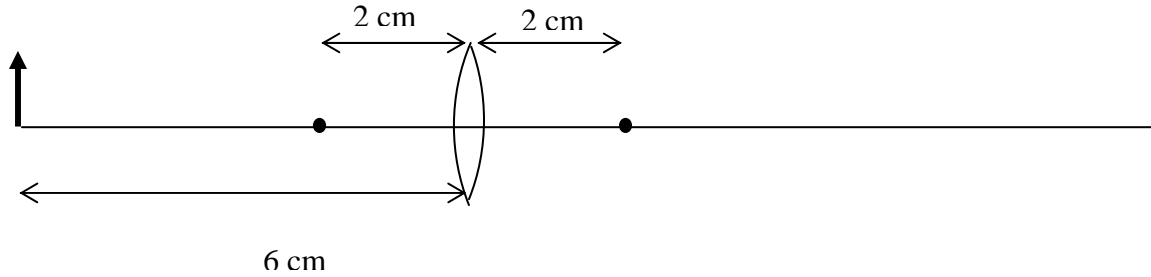
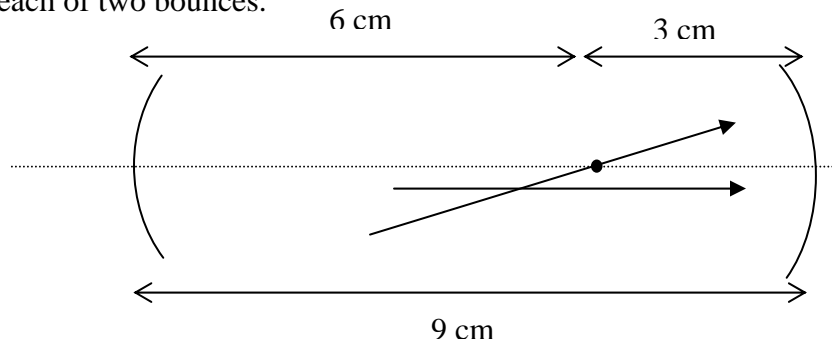


### Sample Ray Tracing Problems

1. An object 1 cm tall stands 6 cm in front of a lens with a focal length of +2 cm.
  - a) Draw a ray diagram showing the image formed by this lens. The two foci of the lens have been drawn in. From your ray diagram, estimate the magnification (including sign) and the approximate distance of the image from the lens
  - b) Now calculate these quantities. How well did you do?



2. A pair of mirrors have focal lengths of 3 cm and 6 cm respectively. The mirrors are exactly 9 cm apart, so they have a common focal point as drawn. The optic axis is drawn in as a dashed line. Two different incoming light rays are drawn. For each of these incoming rays, show how the light is reflected after it bounces off of each mirror. In other words, show as accurately as possible the direction of the rays for each of two bounces.



4. A diverging lens and a curved mirror are arranged such that the focal point of the mirror ( $P$ ) coincides with one of the focal points of the diverging lens. One incoming ray is parallel to the optic axis. It misses the lens, bounces off of the mirror, and then passes through the lens. Show how its direction changes at each step. The other one is headed straight for the far focus of the diverging lens. It passes through the lens, bounces off of the mirror, and then passes back through the lens. Show how its direction changes at each step.

