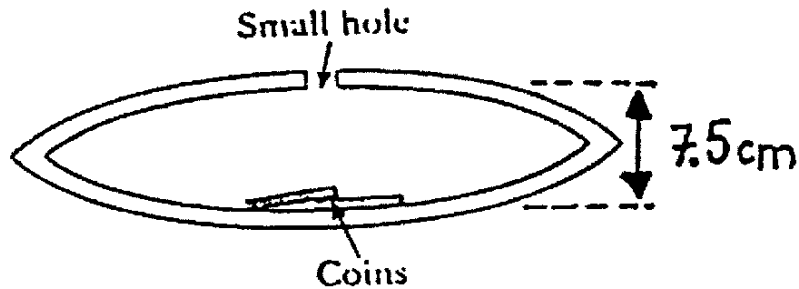


### Physics 2P51 Assignment 3

Due: Friday, March 6, 2020 in drop box across from MC B210a by 2:00 pm.

1. A floating coin illusion consists of two mirrors, each having a radius of curvature of 15cm, facing each other so that their centers are 7.5 cm apart.



- (a) Use the matrix method to find the locations of the first and second principal planes of the system. Assume the light reflects first from the top mirror, and do not be concerned by the fact that it has a hole in its center. Show the positions of  $h_1$  and  $h_2$  on a scale diagram.
  - (b) Show that if a few coins are placed on the lower mirror, an image is formed at the small opening at the center of the top mirror.
2. Two thin lenses, 5.0 cm in diameter each and of focal lengths +10 cm and +6.0 cm, respectively, are placed 4.0 cm apart. An aperture stop 2 cm in diameter is set halfway between the lenses. Find the diameters of the entrance pupil and the exit pupil. **NOTE: Do this problem by calculation and by graphical ray tracing.**