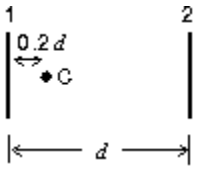
*Plane mirror*

A person who is wants to buy a mirror in which he can see his entire body. Find the minimum height of the mirror he needs relative to his own height (as long as the mirror is placed at the appropriate height).

*Answer:* $h/2$

A candle C sits between two parallel mirrors, a distance $0.2\ d$ from mirror 1, where $d$ is the distance between the mirrors. Multiple images of the candle appear in both mirrors. How far behind mirror 1 are the nearest three images of the candle in that mirror?




*Answer:* $0.2d,\ 1.8d,\ 2.2d$

*Concave mirror*

BW.32.45. You have a spherical mirror with radius of curvature of $+\ 20\ cm$ (so it is concave facing you). You are looking at an object whose size you want to double in the image, so you can see it better. Note that the image might be inverted.

a. Where should you put the object?

b. Where will the image be, and will it be real or virtual?

c. Build the ray diagrams and compare to your answers.

*Answer:* $5\ cm\ OR\ 15\ cm;\ -10\ cm$

*Two-lens system*

An object is placed in front of two this symmetrical coaxial lenses with focal lengths $f_1 = 24\ cm$ and $f_2 = 9\ cm$, respectively, and with lens separation $\mathrm{L} = 10\ cm$. The object is $6\ cm$ from lens one.

a. Where does the system of two lenses produce an image of the object?

b. Build the ray diagram and compare to your calculations.

*Answer:* $18\ cm$

*Lens and mirror*

BW.33.93. A converging lens of focal length $f = 50\ cm$ is placed $175\ cm$ to the left of a metallic sphere of radius $100\ cm$. An object of height $h = 20\ cm$ is placed $30\ cm$ to the left of the lens.

a. What is the height of the image formed by the metallic sphere?

b. Build the ray diagram and compare to your calculations.

*Answer:* $8.3\ cm$

GR.R.22-25.26. An object is placed between a concave mirror with a radius of curvature of $18\ cm$ and a diverging lens with a focal lens of magnitude $12.5\ cm$. The object is $15\ cm$ from the mirror and $20\ cm$ from the lens. Looking through the lens you see two images: image 1 is formed by light rays that reflect from the mirror before passing through the lens, and image 2 is formed by light rays that pass through the lens without reflecting from the mirror. Find the location of each image and specify whether it is inverted or upright, real or virtual.

*Hint:* treat the mirror lens combination the same way you would treat two lenses.

*Answer:* $6.25\ cm$ and $7.7\ cm$ behind the lens