Optics #3

p 844 MC 6, 8
p 845 Problems 12, 16, 19, 21
Online Ray Tracing for Convex

p 844 – Multiple Choice (6)

6) Convex mirror can produce what image? (1)

- Virtual, Smaller, upright

~~d) Convex Lens~~

– Problems

12) Person looks at convex spoon. Moves closer (1)

- image size will increase

16) A) An object 10cm from concave mirror w/ focal length 7cm

$d_o = 10cm$
$f = +7cm$

$\frac{1}{f} = \frac{1}{d_o} + \frac{1}{d_i}$ $\quad d_i = \left(\frac{1}{f} - \frac{1}{d_o}\right)^{-1}$ (1)

$$d_i = \left(\frac{1}{7cm} - \frac{1}{10cm}\right)^{-1} = 23cm$$

B) $d_o = 10cm$
$f = -7cm$

$\frac{1}{f} = \frac{1}{d_o} + \frac{1}{d_i}$ $\quad d_i = \left(\frac{1}{f} - \frac{1}{d_o}\right)^{-1}$

$$d_i = \left(\frac{1}{-7cm} - \frac{1}{10cm}\right)^{-1} = -4.1cm$$

19) Convex mirror

$f = -1.2\,m$
$d_o = 3.0\,m$
$d_i = ?$

A) $d_i = ?$ $\quad d_i = \left(\frac{1}{f} - \frac{1}{d_o}\right)^{-1}$

$$d_i = \left(\frac{1}{-1.2m} - \frac{1}{3.0m}\right)^{-1}$$

$$d_i = -.86m$$

(1)

B) $m = \frac{h_i}{h_o} = \frac{-d_i}{d_o}$ $\quad h_i = \frac{-d_i h_o}{d_o}$

$h_o = 1.7\,m$
$h_i = ?$

$$h_i = -\frac{(-.86m)(1.7m)}{3.0m}$$

$$h_i = .49\,m$$

21) concave mirror

$f = +20cm$
$m = 1.5m$
$d_o = ?$

(1) $m = \frac{-d_i}{d_o}$ $\quad d_i = -md_o$

(2) $\frac{1}{f} = \frac{1}{d_o} + \frac{1}{d_i}$ $\quad \frac{1}{f} = \frac{1}{d_o} + \frac{1}{-md_o}$

$$\frac{1}{f} = \left(\frac{1}{d_o}\right)\left(1 - \frac{1}{m}\right)$$

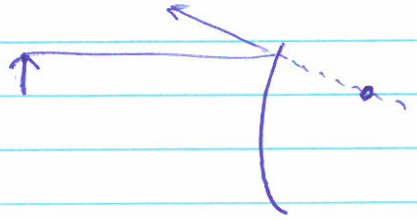
$$d_o = f\left(1 - \frac{1}{m}\right) = 20cm\left(1 - \frac{1}{1.5}\right)$$

$$d_o = 6.7cm$$

- Online Ray Tracing for Convex

A) 

• in through F, out //

B) 

• in //, out through F

(1)

c) image? • virtual image behind mirror

D Find image