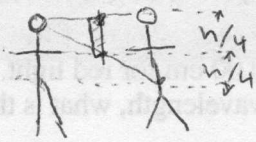
Name: _____ Class: _____ Date: _____ ID: A

t2q3

Multiple Choice
Identify the letter of the choice that best completes the statement or answers the question.

____ 1. What is the minimum size of a wall-mounted mirror in order to view the upper half of ones height, h?
a. h
b. h/2
c. h/4
d. h/3
e. The answer is not given.

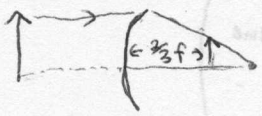


____ 2. An object placed 12 cm from a concave mirror produces a real image 8.0 cm from the mirror. If the object is now moved to a new position 18.0 cm from the mirror, where is the new image located as measured from the mirror?
a. 3.0 cm
b. 6.5 cm
c. 9.2 cm
d. 14.6 cm
e. 17.1 cm

$\frac{1}{12cm} + \frac{1}{8cm} = \frac{1}{f} \Rightarrow f = \frac{24}{5}\,cm$

$\frac{1}{18cm} + \frac{1}{I} = \frac{5}{24} \Rightarrow I = 6.5cm$

____ 3. An object is held at a distance of 12 cm from a convex mirror creating an image that is 1/3 the object size. What is the focal length of the mirror?
a. −6.0 cm
b. −3.0 cm
c. −9.0 cm
d. −18 cm
e. −24 cm



$\frac{1}{12cm} + \frac{1}{\frac{2}{3}f} = \frac{1}{f} \Rightarrow \frac{1}{12cm} = \frac{1}{f}\left(1 - \frac{3}{2}\right)$

$\Rightarrow f = -6\,cm$

____ 4. Sally places an object 6.0 cm from a thin convex lens along its axis. The lens has a focal length of 9.0 cm. What are the respective values of the image distance and magnification?
a. −18 cm and 3.0
b. 18 cm and 3.0
c. 3.0 cm and −0.50
d. −18 cm and −3.0
e. −18 cm and −0.50

$\frac{1}{6cm} + \frac{1}{I} = \frac{1}{9cm} \Rightarrow I = -18cm$

$M = \left(\frac{-18cm}{6cm}\right)\cdot(-1) = 3$

____ 5. Two thin lenses with focal lengths 25.0 cm and 30.0 cm are placed in contact in an orientation so that their optic axes coincide. What is the focal length of the two in combination? Hint: A thin lens is one whose thickness is negligible.
a. 13.6 cm
b. 27.5 cm
c. 55.0 cm
d. 150 cm
e. 175 cm

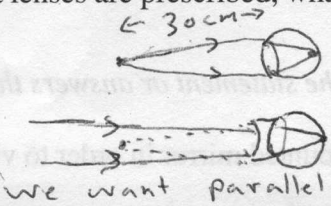
$\frac{1}{f} = \frac{1}{f_1} + \frac{1}{f_2} \Rightarrow f = 13.6$

____ 6. What is the image distance of an object 1.00 m in front of a converging lens of focal length 20.0 cm?
a. +16.7 cm
b. +20.0 cm
c. +25.0 cm
d. +33.3 cm
e. +37.5 cm

$\frac{1}{100cm} + \frac{1}{I} = \frac{1}{20cm} \Rightarrow I = 25.cm$

____ 7. A nearsighted person cannot see objects clearly beyond 30 cm (the far point). If the patient has no astigmatism and contact lenses are prescribed, what is the power of the lens required to correct the patient's vision?

a. –2.0 diopters
(b) –3.3 diopters
c. –4.0 diopters
d. –5.0 diopters
e. –6.0 diopters



$f = -30cm$

$P = \frac{1}{-.3m} = -3.3$ diopters

(we want parallel rays to diverge from the lens as if they came from 30cm away.)

____ 8. A thin lens has a focal length of 10.00 cm for red light. If the index of refraction for the lens material tends to decrease with increasing wavelength, what is the focal length of the lens for blue light?

a. also 10.00 cm
(b) less that 10.00 cm
c. more than 10.00 cm
d. It depends on whether the lens is converging or diverging.

Blue light has shorter wavelength, so it will have a higher index of refraction,