November-25-10
12:17 PM

Review class Rules for mirrors

d_o is positive for real objects
~~is negative for virtual objects~~ } This will never happen

d_i is ⊕ ive for real objects
is ⊖ ive for virtual objects

f is ⊕ ive for concave mirrors
is ⊖ ive for convex mirrors

ex) a concave mirror has radius of curvature of 20 cm
an object is 2 cm high is placed 30 cm from mirror
find d_i

f = ⊕ ive 10 cm since concave
d_o = ⊕ ive 30 cm since real
d_i = ?

$$\frac{1}{d_i} = \frac{1}{f} - \frac{1}{d_o}$$

$$= \frac{1}{10} - \frac{1}{30}$$

$$= \frac{3}{30} - \frac{1}{30}$$

$$\frac{1}{d_i} = \frac{2}{30}$$

$$d_i = \frac{30}{2} = 15\text{cm}$$

find h_i

$$\frac{h_i}{h_o} = \frac{-d_i}{d_o}$$

$$h_i = \frac{-d_i h_o}{d_o} = \frac{-(15\text{cm})(2\text{cm})}{30\text{cm}}$$

$= -1\,cm$ (Inverted)

ex A convex mirror in a warehous has radius of curvature of 1.0 m, A 2.0 m high forklift is 5.0 m from the mirror, Find d_i, h_i

f = ⊖ lve 0.50m since convex

d_o = ⊕ lve 5 m since real object

d_i = ?

$$\frac{1}{f} = \frac{1}{d_o} + \frac{1}{d_i}$$

$$\frac{1}{d_i} = \frac{1}{f} - \frac{1}{d_o}$$

$$= \frac{1}{-.5} - \frac{1}{5}$$

$$\frac{1}{d_i} = \frac{-10}{5} - \frac{1}{5}$$

$$d_i = \frac{-5}{11} = -.454\,m$$

$$\frac{h_i}{h_o} = -\frac{d_i}{d_o}$$

$$h_i = -\frac{d_i\, h_o}{d_o} = \frac{-(-.454)(2)}{5}$$

$$= .18\,m \text{ (erect)}$$

Rules for lenses

f = ⊕'ve for convex lenses
⊖'ve for concave lenses

d_o = ⊕'ve on the object side of the lens

d_i = ⊕'ve on the other side where the image is real

d_i = ⊖'ve on the object side of the lens where image are virtual

ex an object is placed 32 cm from a convex lens that has a focal length of 8.0 cm
find d_i

d_o = ⊕'ve 32 cm since its real

f = ⊕ 've 8 cm convex lens

d_i = ?

$$\frac{1}{d_i} = \frac{1}{f} - \frac{1}{d_o}$$

$$= \frac{1}{8} - \frac{1}{32}$$

$$= \frac{4}{32} - \frac{1}{32}$$

$$\frac{1}{d_i} = \frac{3}{32}$$

$$d_i = \frac{32}{3} = 10.67 \text{ cm} \quad \text{(Inverted)}$$

find h_i if $h_o = 3.0\,cm$

$$\frac{h_i}{h_o} = \frac{-d_i}{d_o}$$

$$h_i = \frac{-d_i\, h_o}{d_o}$$

$$= \frac{\left(-\frac{32}{3}\right)(3)}{32}$$

$$= -1\,cm \quad \text{(inverted)}$$

Pg 388 T/B # 4 – 10 (Problems) → mirror
→ lense

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Ans key H/O section