

# Math for Convex Mirrors

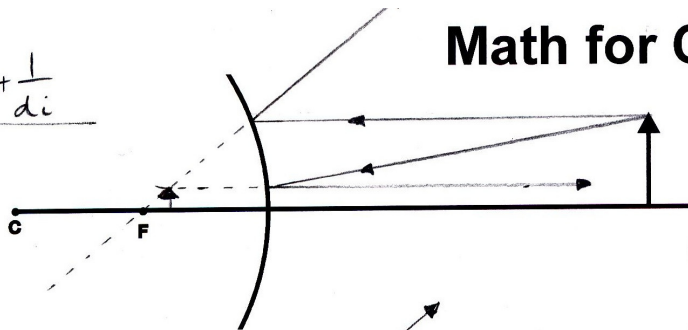
using  $\frac{1}{f} = \frac{1}{d_o} + \frac{1}{d_i}$

$$\frac{1}{-2} = \frac{1}{6} + \frac{1}{d_i}$$

$$-\frac{1}{2} - \frac{1}{6} = \frac{1}{d_i}$$

$$-\frac{4}{6} = \frac{1}{d_i}$$

$$d_i = -\frac{3}{2}$$



$$M = \frac{-d_i}{d_o}$$

$$M = -\left(\frac{-3}{2}\right)$$

$$M = \frac{1.5}{6}$$

$$M = 0.25$$

$$M = \frac{h_i}{h_o}$$

$$0.25 = \frac{h_i}{1.5}$$

$$h_i = 0.375$$

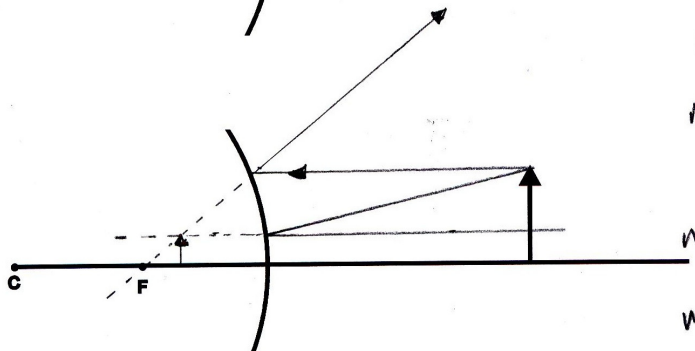
B.  $d_i$

$$-\frac{1}{2} = \frac{1}{4} + \frac{1}{d_i}$$

$$\frac{1}{2} - \frac{1}{4} = \frac{1}{d_i}$$

$$-\frac{3}{4} = \frac{1}{d_i}$$

$$d_i = -\frac{4}{3}$$



$$M = \frac{-d_i}{d_o}$$

$$M = -\left(\frac{-4}{3}\right)$$

$$M = 0.3$$

$$0.3 = \frac{h_i}{1.5}$$

$$h_i = 0.5$$

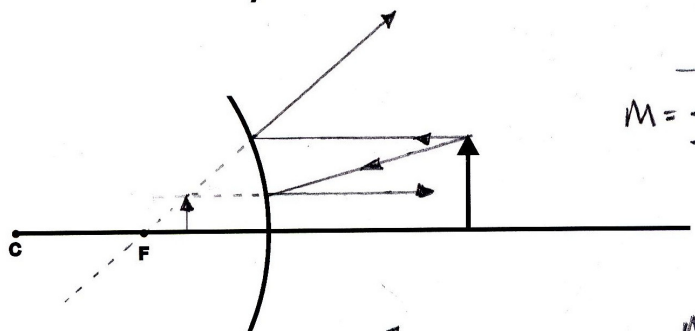
C.  $d_i$

$$-\frac{1}{2} = \frac{1}{3} + \frac{1}{d_i}$$

$$-\frac{1}{2} - \frac{1}{3} = \frac{1}{d_i}$$

$$-\frac{3}{6} - \frac{2}{6} = \frac{1}{d_i}$$

$$d_i = -\frac{6}{5}$$



$$M = \frac{-d_i}{d_o}$$

$$M = -\left(\frac{-6}{5}\right)$$

$$M = 0.4$$

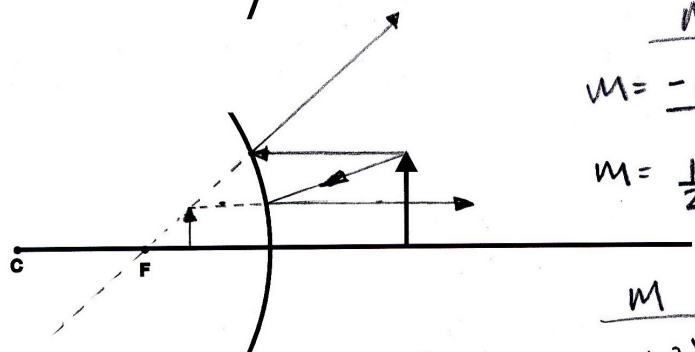
$$0.4 = \frac{h_i}{1.5}$$

$$h_i = 0.6$$

D.  $d_i$

$$-\frac{1}{2} = -\frac{1}{2} + \frac{1}{d_i}$$

$$d_i = -1$$



$$M = \frac{-d_i}{d_o}$$

$$M = \frac{-(-1)}{2}$$

$$M = \frac{1}{2}$$

$$0.5 = \frac{h_i}{1.5}$$

$$h_i = 0.75$$

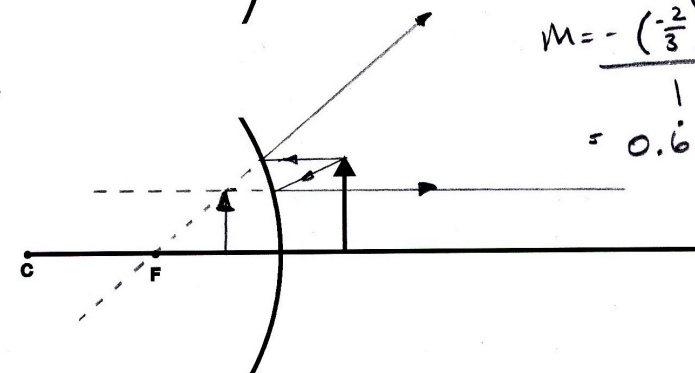
E.  $d_i$

$$-\frac{1}{2} = -\frac{1}{1} + \frac{1}{d_i}$$

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

$$-\frac{3}{2} = \frac{1}{d_i}$$

$$-\frac{2}{3} = d_i$$



$$M = \frac{-d_i}{d_o}$$

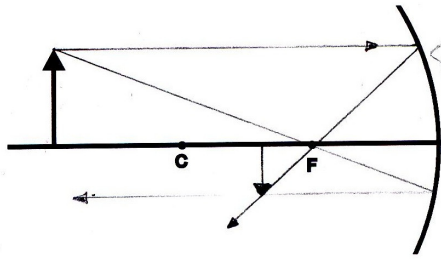
$$M = -\left(\frac{-2}{3}\right)$$

$$= 0.6$$

$$0.6 = \frac{h_i}{1.5}$$

$$h_i = 1$$

# MATH FOR CONCAVE MIRRORS



using  $M = \frac{d_i}{d_o}$

$$M = \frac{-6}{3}$$

$$M = -\frac{1}{2}$$

↑  
image is inverted

using  $\frac{1}{f} = \frac{1}{d_o} + \frac{1}{d_i}$  where  $f = 2\text{cm}$   
 $d_o = 6\text{cm}$

$$\frac{1}{2} = \frac{1}{6} + \frac{1}{d_i}$$

$$\frac{1}{2} - \frac{1}{6} = \frac{1}{d_i}$$

$$\frac{3}{6} - \frac{1}{6} = \frac{1}{d_i}$$

$$\frac{2}{6} = \frac{1}{d_i}$$

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

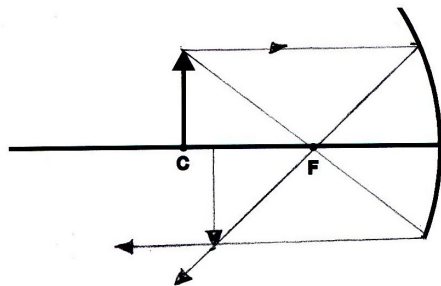
$$d_i = 3$$

$$M = \frac{h_i}{h_o}$$

$$-\frac{1}{2} = \frac{h_i}{1.5}$$

$$h_i = \frac{-1.5}{2}$$

$$= -0.75$$



$$\frac{1}{2} = \frac{1}{4} + \frac{1}{d_i}$$

$$\frac{1}{2} - \frac{1}{4} = \frac{1}{d_i}$$

$$\frac{1}{4} = \frac{1}{d_i}$$

$$d_i = 4$$

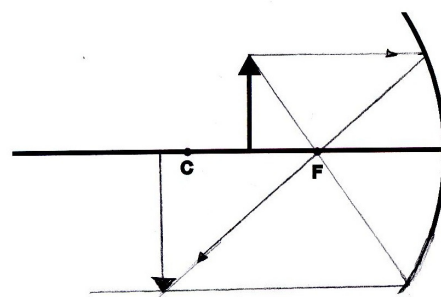
$$M = \frac{-d_i}{d_o}$$

$$M = \frac{-4}{4}$$

$$M = -1$$

$$-1 = \frac{h_i}{1.5}$$

$$h_i = -1.5$$



$$\frac{1}{2} = \frac{1}{3} + \frac{1}{d_i}$$

$$\frac{3}{6} - \frac{2}{6} = \frac{1}{d_i}$$

$$\frac{1}{6} = \frac{1}{d_i}$$

$$d_i = 6$$

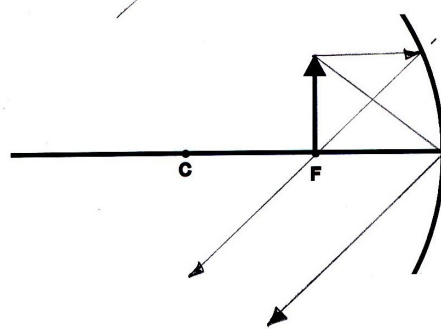
$$M = \frac{-d_i}{d_o}$$

$$M = \frac{-6}{3}$$

$$M = -2$$

$$-2 = \frac{h_i}{1.5}$$

$$h_i = -3$$



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

$$d_i = 0$$

no image

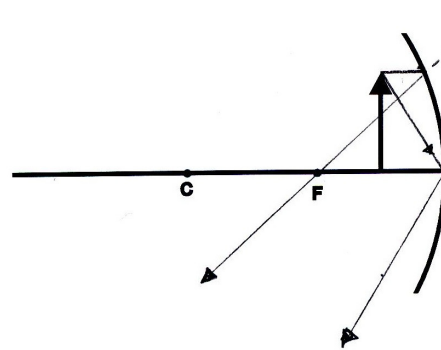
$$M = \frac{-d_i}{d_o}$$

$$M = \frac{-0}{4}$$

$$= 0$$

$$0 = \frac{h_i}{1.5}$$

$$h_i = 0$$



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

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

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

$$d_i = -2$$

$$M = \frac{-d_i}{d_o}$$

$$M = \frac{-(-2)}{3}$$

$$M = \frac{2}{3}$$

$$2 = \frac{h_i}{1.5}$$

$$3 = h_i$$