General Physics 2 | 4th Quarter
WW5: Reflection & Mirrors
April 7 2022

1. Determine the image distance and image height for an $8.00\ cm$ tall object place $35.0\ cm$ from a concave mirror having a focal length of $10.0\ cm$.

$\frac{1}{s_o}+\frac{1}{s_i}=\frac{1}{f}$
$\frac{1}{s_o}+\frac{1}{s_i}-\frac{1}{f}=0$
$s_i\left(\frac{1}{s_o}-\frac{1}{f}\right)=1$
$s_i=\frac{1}{\frac{1}{s_o}-\frac{1}{f}}=\frac{1}{\frac{1}{35}-\frac{1}{10}}=\frac{1}{\frac{2-7}{70}}=\frac{1}{\frac{-5}{70}}=\frac{70}{-5}$
$s_i=-14\ \text{cm}$

$h_i=-h_o\cdot\frac{s_i}{s_o}=-8\cdot\frac{-14}{35}=\frac{112}{35}$
$h_i=\frac{16}{5}\ \text{cm}=3.2\ \text{cm}$

2. Determine the image distance and image height for $6.00\ cm$ tall object placed $10.0\ cm$ from a concave mirror having a focal length of $20.0\ cm$.

$\frac{1}{s_i}=\frac{1}{f}-\frac{1}{s_o}=\frac{1}{20}-\frac{1}{10}=\frac{1-2}{20}=\frac{-1}{20}$
$s_i=-20\ \text{cm}$

$h_i=-h_o\cdot\frac{s_i}{s_o}=-8\cdot\frac{-20}{6}=-4\cdot\frac{-20}{3}=\frac{80}{3}$
$h_i=26\frac{2}{3}\ \text{cm}$

3. A magnified, inverted image is located a distance of $20.0\ cm$ from a concave mirror with a focal length of $8.0\ cm$. Determine the object distance and tell whether the image is real or virtual.

$\frac{1}{s_o}=\frac{1}{f}-\frac{1}{s_i}=\frac{1}{8}-\frac{1}{20}=\frac{5-2}{40}$
$s_o=\frac{40}{3}=13\frac{1}{3}cm$

Image is real