**Answer on Question #71036, Physics / Optics**

An installed surveillance in Camella St. uses a concave mirror whose focal length is 6.24m. A crime scene was recorded where the suspect stabbed a man walking on the street. The suspect image distance from the surveillance was 11.3m. The height of the suspect's image is 0.9m. Make a ray diagram and a sketch of the actual scene

Solution:
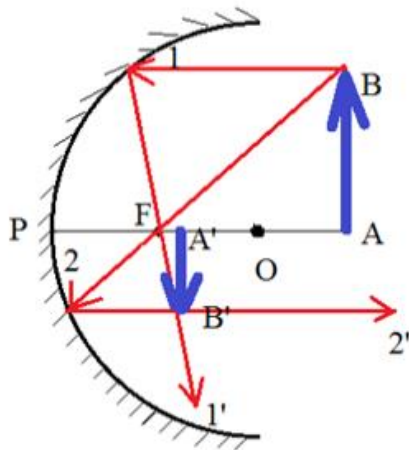
PF is the focal length of concave mirror, PF=f=6.24 m

PA' is image distance, PA'=d_i=11.3 m

PO=2f=12.48 m

PA is the object distance, PA=d_0

AB is the height of the object, AB=H

A'B' is the height of the image, AB=h

The mirror formula in this case:

$\frac{1}{d_0} + \frac{1}{d_i} = \frac{1}{f}$ (1)

Of (1) $\Rightarrow \frac{1}{d_0} = \frac{1}{f} - \frac{1}{d_i}$ (2)

Of (2) $\Rightarrow \frac{1}{d_0} = \frac{d_i - f}{fd_i}$ (3)

Of (3) $\Rightarrow d_0 = \frac{fd_i}{d_i - f}$ (4)

Of (4) $\Rightarrow d_0$=13.94 m

Magnification of mirror: $k = \frac{d_0}{d_i} = \frac{H}{h}$ (5)

Of (5) $\Rightarrow H = \frac{d_0}{d_i} h$ (6)

Of (6) $\Rightarrow$ H=1.11 m