QUESTION:

An object is kept in front of cocave mirror of FL 20cm. The image is 3 times the size of the object find two possible DIS of object frm the mirror.

SOLUTION:

(I guess that FL is focus length, the image is 3 times (larger, I think)) and DIS is distance)

The image provided by the concave mirror is magnified when

a) Object is located between focal point and mirror (in this case image is virtual and upright)

b) Object is located between focus and centre of curvature (image is real and vertically inverted)

Let's consider the first case:

$\frac{1}{d_{ob}}-\frac{1}{d_{im}}=\frac{1}{f}$ is the mirror equation (d_{ob} and d_{im} are the object and image distance respectively, $d_{im}<0$ because the image is virtual).

The magnification is

$$m=\left|\frac{d_{im}}{d_{ob}}\right|=3$$

Hence, $d_{im}=3d_{ob}$ and:

$$\frac{1}{d_{ob}}-\frac{1}{3d_{ob}}=\frac{1}{f}$$

$$\frac{2}{3d_{ob}}=\frac{1}{f}$$

$$d_{ob}=\frac{2f}{3}$$

$$d_{ob}=13.3\ \text{cm}$$

Let's consider the second case:

$\frac{1}{d_{ob}}+\frac{1}{d_{im}}=\frac{1}{f}$ is the mirror equation (d_{ob} and d_{im} are the object and image distance respectively, $d_{im}>0$ because the image is real).

The magnification is

$$m=\left|\frac{d_{im}}{d_{ob}}\right|=3$$

Hence, $d_{im}=3d_{ob}$ and:

$$\frac{1}{d_{ob}}+\frac{1}{3d_{ob}}=\frac{1}{f}$$

$$\frac{4}{3d_{ob}}=\frac{1}{f}$$

$$d_{ob}=\frac{4f}{3}$$

$$d_{ob}=26.7\ \text{cm}$$

ANSWER

13.3 cm and 26.7 cm