41. **SSM** **WWW** ***REASONING*** This problem can be solved by using the mirror equation, Equation 25.3, and the magnification equation, Equation 25.4.

SOLUTION

a. Using the mirror equation with $d_i = d_o$ and $f = R/2$, we have

$$\frac{1}{d_o} = \frac{1}{f} - \frac{1}{d_i} = \frac{1}{R/2} - \frac{1}{d_o} \qquad \text{or} \qquad \frac{2}{d_o} = \frac{2}{R}$$

Therefore, we find that $\boxed{d_o = R}$.

b. According to the magnification equation, the magnification is

$$m = -\frac{d_i}{d_o} = -\frac{d_o}{d_o} = \boxed{-1}$$

c. Since the magnification m is negative, the image is $\boxed{\text{inverted}}$.