An object 5.0cm high is located 50cm in front of a convex mirror. The radius of the mirror is 30cm. Find a) the location of the image, and b) describe the image and calculate the magnification of the mirror.

Mirrors's equation:

$$\frac{1}{d_0} + \frac{1}{d_i} = \frac{2}{R}$$

where d_0 – distance to object, d_i – distance to image.

$$\frac{1}{d_i} = \frac{2}{R} - \frac{1}{d_0} = \frac{2d_0 - R}{Rd_0} \rightarrow d_i = \frac{Rd_0}{2d_0 - R}$$

$$d_i = \frac{0.3m * 0.5m}{2 * 0.5m - 0.3m} = 0.21m$$

Magnification:

$$M = \frac{d_i}{d_o} = \frac{R}{2d_0 - R}$$

$$M = \frac{0.3m}{2 * 0.5m - 0.3m} = 0.43$$

Image is virtual, reduced and upright

Answer: $d_i = 0.21m$, $M = 0.43$