A dentist uses a small mirror of radius 40 mm to locate a cavity in a patient's tooth. If the mirror is concave and is held 11 mm from the tooth, what is the magnification of the image?

Equation for concave mirror:

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

where d_0 -object distance, d_i- image distance, R – radius of curvature.

In this case, magnification:

$$m = -\frac{d_i}{d_0}$$

From the first equation:

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

Thus, magnification:

$$m = -\frac{\frac{Rd_0}{2d_0 - R}}{d_0} = -\frac{R}{2d_0 - R}$$

$$m = -\frac{40mm}{2*11mm - 40mm} = 2.22$$

Answer: $m = 2.22$