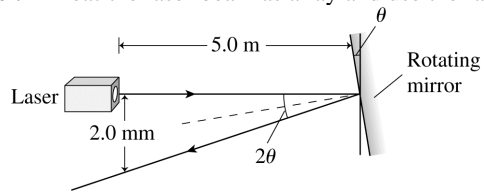


23.42. Model: Treat the laser beam as a ray and use the ray model of light.
Visualize:



As the cylinder rotates by an angle θ , the path of the reflected laser beam changes by an angle 2θ relative to the direction of incidence.

Solve: Because the angle 2θ is very small,

$$\tan 2\theta \cong 2\theta = \frac{2.0 \times 10^{-3} \text{ m}}{5.0 \text{ m}} \Rightarrow \theta = \frac{1}{5000} \text{ rad} = \frac{180}{\pi(5000)} \text{ degrees} = 0.0115^\circ$$