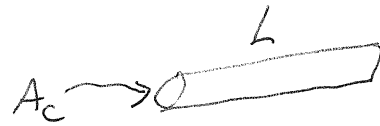


Determine the ratio of the heaviest string diameter to the lightest string diameter if a heavy string on a violin has a linear density of 3.0 g/m and a light string has a linear density of $0.29 \frac{\text{g}}{\text{m}}$. The strings are made of the same material.



$$\rho = \frac{m}{V}$$

$$V = \frac{\pi d^2}{4} L$$

$$u = \frac{m}{L}$$

$$\frac{u_H K}{\frac{\pi d_H^2}{4} K} = \rho = \frac{u_L K}{\frac{\pi d_L^2}{4} K}$$

$$\frac{4}{\pi} \frac{u_H}{d_H^2} = \frac{4}{\pi} \frac{u_L}{d_L^2}$$

$$\frac{u_H}{u_L} = \frac{d_H^2}{d_L^2}$$

$$\frac{d_H}{d_L} = \sqrt{\frac{u_H}{u_L}}$$

$$= \sqrt{\frac{3.0 \text{ g/m}}{0.29 \text{ g/m}}} = \boxed{3.2}$$