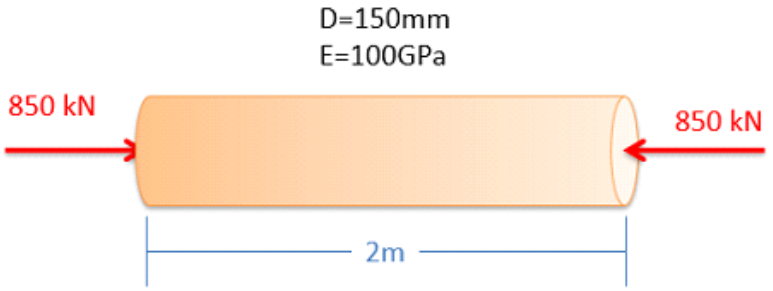
Problem 1

A cylindrical brass rod has a length of 2 meters and a diameter of 150 mm. It's subjected to an 850 kN compressive load. Assume brass has a Young's Modulus of 100 GPa.

- What is the expected stress?
- What is the expected change in length under loading?



a) $\sigma = \frac{F}{A} = \frac{850{,}000\ N}{\pi(.075m)^2} = 48.1 \times 10^6 \frac{N}{m^2}$

$= 48.1\ MPa$ compression

b) $\delta = \frac{PL}{AE} = \frac{-(850{,}000\ N)(2m)}{\pi(.075m)^2\left(100 \times 10^9 \frac{N}{m^2}\right)} = -9.62 \times 10^{-4}\ m$

$= -.962\ mm$