

Solution to #85710, Physics/Classical mechanics

Comparing the total volume occupied by the string with the volume of ball gives rise to relation as

$$L = \frac{4R^3}{d^2}$$

Where L is the length of string

R is the radius of ball=10cm=0.10m

d is the thickness of string=2mm=2/1000 m

Dimension should have same units

$$L = \frac{4R^3}{d^2}$$

$$L = \frac{4(0.1)^3}{\left(\frac{2}{1000}\right)^2}$$

$$L = \frac{0.004}{4(10)^{-6}}$$

$$L = 1000m$$

$$L=1km$$

Possible error: While deriving the formula

- i) Calculation is based on assumption of ball is spherical
- ii) It is possible that strings in the ball is not closely packed and have gaps between uncountable gaps between adjacent sections of the string
- iii) The value of pie is assume as 3.00 but actual is 3.14

Answer provided by <https://www.AssignmentExpert.com>