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in the measurement of the diameter is  $\Delta x = \pm 0.05\text{cm}$ , and the corresponding maximum error in the calculation of volume is

$$\text{Maximum error in volume} = \Delta V \approx (V'(2.5))(\pm 0.05)$$

Since

$$V'(x) = \frac{1}{6}\pi(3x^2) = \frac{1}{2}\pi x^2 \text{ and } V'(2.5) \approx 9.817$$

it follows that

$$\text{Maximum error in volume} = (9.817)(\pm 0.05) \approx \pm 0.491$$

Thus, at worst, the calculation of the volume as  $8.181 \text{ cm}^3$  is off by  $0.491 \text{ cm}^3$ , so the actual volume  $V$  must satisfy

$$7.690 \leq V \leq 8.672$$