A dugout canoe is approximately equivalent in shape to a half-cylinder with a smaller half-cylinder removed from it.

The full length of the average dugout was 7m, and the outer width was 60cm. The inner length was 6.3m and the inner width 50cm. Draw and annotate a diagram, and find the total volume of wood used.

Ext: Find the weight of a dugout given that the density of the wood (white pine) was $0.4g/cm^3$.

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Dugout Solutions:

Outer half-cylinder volume: $V = \frac{1}{2} \times \pi \times 0.3^2 \times 7 = \mathbf{0.9896m^3\ to\ 4\ d.p.}$

Inner half-cylinder volume: $V = \frac{1}{2} \times \pi \times 0.25^2 \times 6.3 = \mathbf{0.6185m^3\ to\ 4\ d.p.}$

Overall volume of the canoe: $0.9896 - 0.6185 = \mathbf{0.3711m^3\ to\ 4\ d.p.}$

Ext: $0.3711m^3 = 371100cm^3 \quad \Longrightarrow \quad mass = 371100 \times 0.4 = 148440g = \mathbf{148kg\ to\ 3\ s.f.}$

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