Quantitative Methods Volume

Module No. Cons 1012

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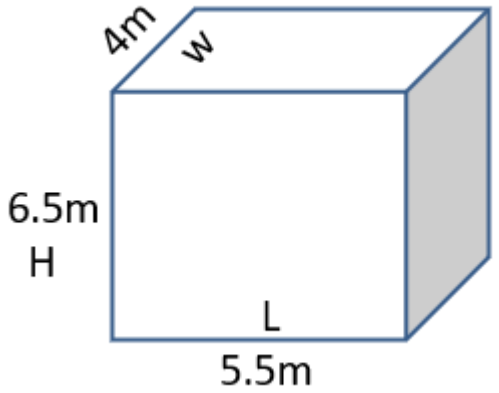
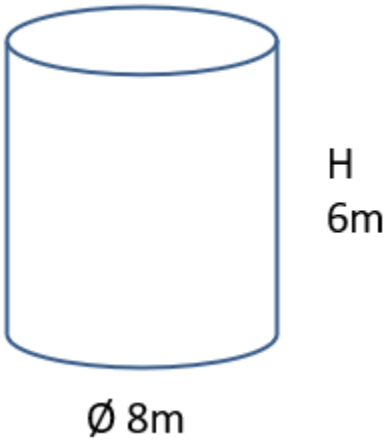
Volume

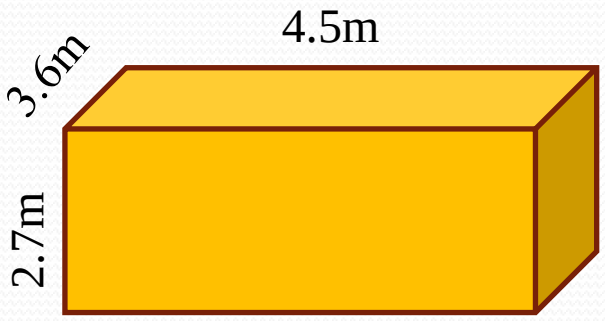
- The **Volume** of an object is the amount of space that it occupies.
- The **S.I. Unit** for volume is the cubic metre
- The **S.I. Symbol** for volume is m^3
- Rectangular Solids
- Length x Width x Height
- $5.5 \times 4 \times 6.5 = 143m^3$



- The Cylinder
- Area of Base x Height
- $\pi \times 4^2 \times 6 = 301.59\ m^3$



Volume

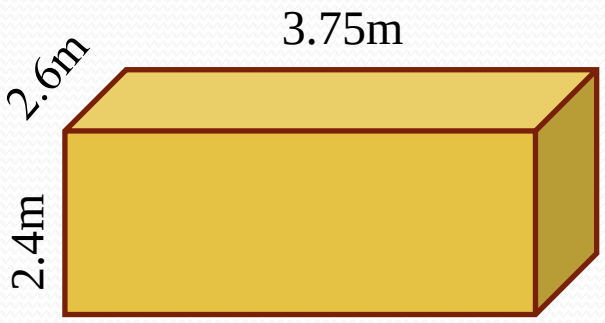


- The **S.I. Symbol** for volume is m^3
- Length x Breadth x Height
- L x B x H = Volume
- 4.5 x 3.6 x 2.7 = 43.74m^3

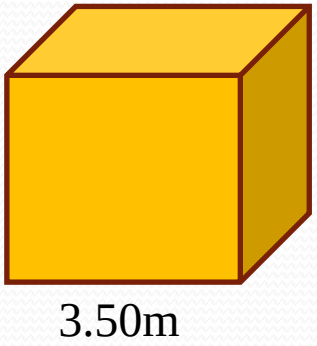
- When calculating Volume you should bring all measurements to the same SI unit.
- 23cm = 0.23m
- 23mm = 0.023m

Volume

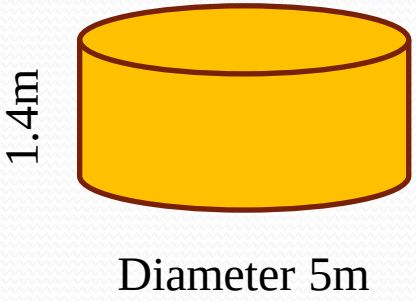
- Q 1. Calculate the Volume of the cuboid.



- Q 2. Calculate the Volume of the cube.

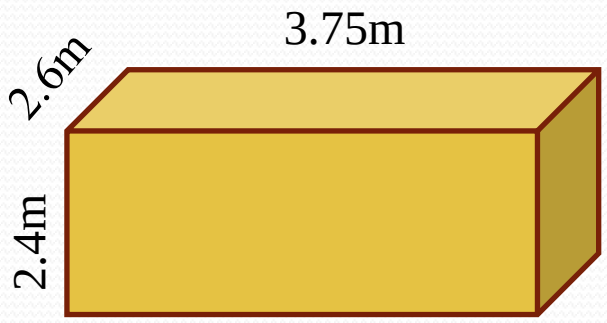


- Q 3. Calculate the Volume of the cylinder.

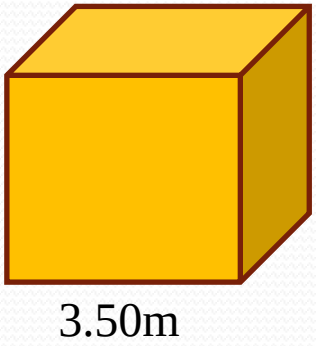


Volume

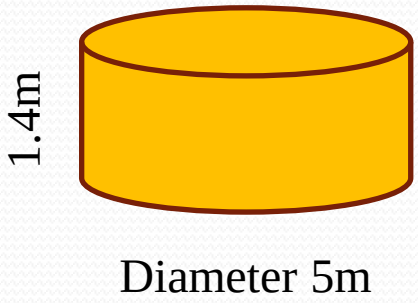
- Q 1. Calculate Volume of the cuboid.
- L x B x H = Volume
- 3.75 x 2.6 x 2.4 = 23.4m³



- Q 2. Calculate the Volume of the cube
- L x B x H = Volume
- 3.5 x 3.5 x 3.5 = 42.875m³

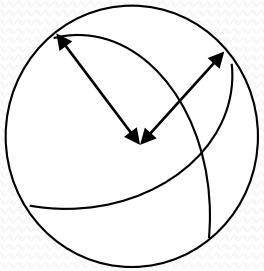


- Q 3. Calculate the Volume of the cylinder.
- $\pi r^2 h$ = Volume
- $\pi \times 2.5^2 \times 1.4$ = 27.48m³



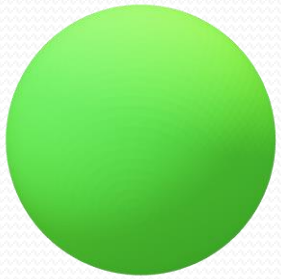
Volume of Sphere

- Calculate the Volume of the Sphere.
- Formula: Volume = $\frac{4 \pi r^3}{3}$
- $\frac{4 \times \pi \times 2^3}{3} = \frac{100.53}{3} = 33.510 m^3$
- Q 1. Calculate the Volume of the Sphere A.
- Q 2. Calculate the Volume of the Sphere B.



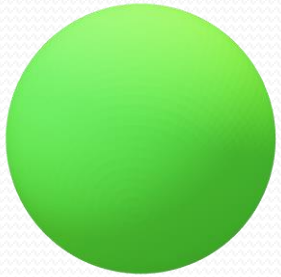
Radius = 2m

A



Radius = 3.75m

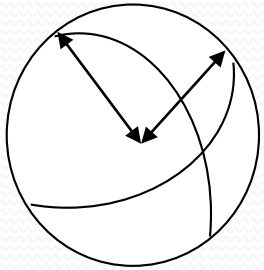
B



Diameter = 7.5m

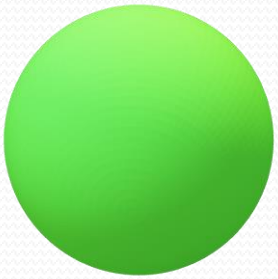
Volume of Sphere

- Calculate the Volume of the Sphere.
- $\frac{4 \times \pi \times 2^3}{3} = \frac{100.53}{3} = 33.510m^3$



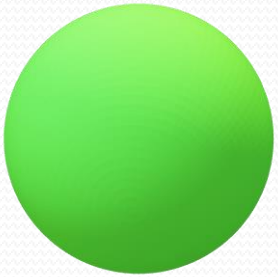
Radius = 2m

- Q 1. Calculate the Volume of the Sphere A. A
- $\frac{4 \times \pi \times 3.75^3}{3} = \frac{662.679}{3} = 220.893m^3$



Radius = 3.75m

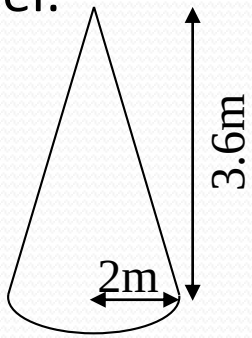
- Q 2. Calculate the Volume of the Sphere B. B
- $\frac{4 \times \pi \times 3.75^3}{3} = \frac{662.679}{3} = 220.893m^3$

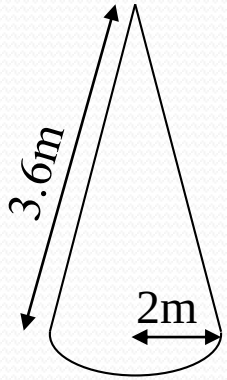


Diameter = 7.5m

Volume of Cones

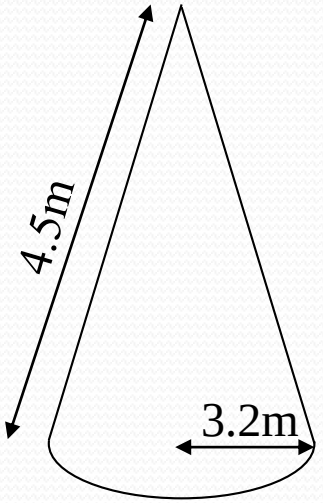
- ***NOTE:*** When working with cones you need vertical height to calculate **volume** and sloping side length to calculate surface area. If you only have one of these, you may need to work out the other.
- E.g. 1. Calculate the volume of the Cone.
- Formula: = ⅓ π r^2 h
- ⅓ x π x 2^2 x 3.6 = 15.079m^3
- E.g.2. Calculate the Volume of the Cone.
- First, we need the height Pythagoras Theorem $a^2 + b^2 = c^2$
- $3.6^2 - 2^2 = 8.96$
- √8.96 = 2.99m
- ⅓ x π x 2^2 x 2.99 = 12.511m^3



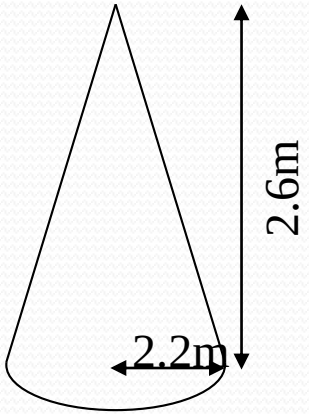


Volume of Cones

- Q 1. Calculate the Volume of the Cone.
- Formula: Volume = ⅓ π r^2 h
- First, we need height Pythagoras Theorem $a^2 + b^2 = c^2$

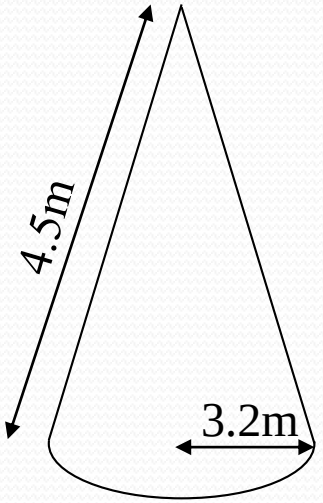


- Q 2. Calculate the Volume of the Cone.

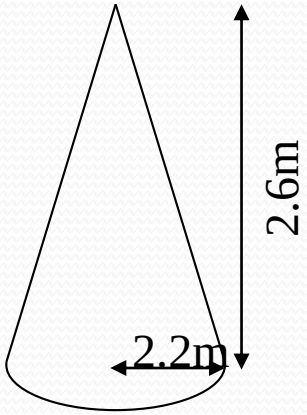


Volume of Cones

- Q 1. Calculate the Volume of the Cone.
- Formula: Volume = ⅓ π r^2 h
- First, we need height Pythagoras Theorem $a^2 + b^2 = c^2$
- $4.5^2 - 3.2^2 = 10.01$
- $\sqrt{10.01} = 3.16$m
- ⅓ x π x 3.2^2 x 3.16 = 33.85m^3

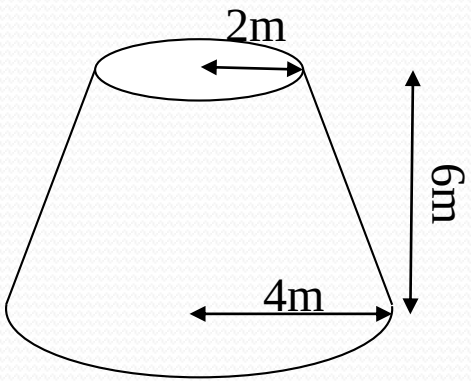


- Q 2. Calculate the Volume of the Cone.
- ⅓ x π x 2.2^2 x 2.6 = 13.16m^3



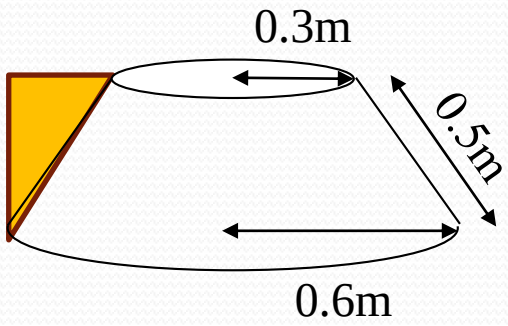
Volume of Truncated Cones

- Q7. Calculate the Volume of the Truncated Cone.
- Formula: Volume = $\frac{1}{3} \pi h(R^2+\{Rr\}+r^2)$
- Volume = $\frac{1}{3} \pi 6 (4^2 + \{4 \times 2\} + 2^2)$
- $= \frac{1}{3} \times \pi \times 6 (28)$
- $= 175.929 m^3$



Volume of Truncated Cones

- ***NOTE:*** if we are not given the height then we must find it using Pythagoras Theorem $a^2 + b^2 = c^2$
- Q 6. $0.5^2 - 0.3^2 = 0.16$ $\sqrt{0.16} = 0.4$m



- Volume = ⅓ π h(R^2+{Rr}+r^2)
- Volume = ⅓ π 0.4 (0.6^2 + {0.6 x 0.3} + 0.3^2)
- ⅓ x π x 0.4 x (0.63) = 0.264m^3
-
- Calculate the Volume of the Truncated Cone
- Formula: Volume = ⅓ π h(R^2+{Rr}+r^2)
- Volume = ⅓ π 4 (5^2 + {5 x 2} + 2^2)
- = ⅓ x π x 4 (39)
- = 163.36m^3