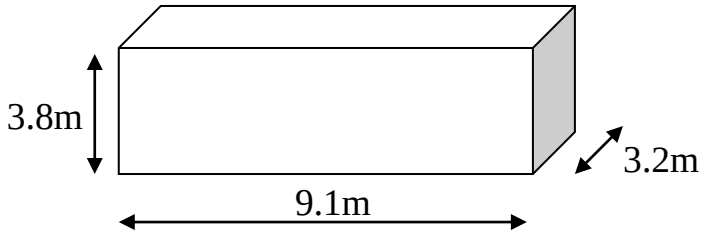
Volume and Surface Area

Calculate the volume and the surface area for each of the following shapes. *(When calculating surface area you can assume the top and bottom of the shapes are left open if it is possible to do so.)*

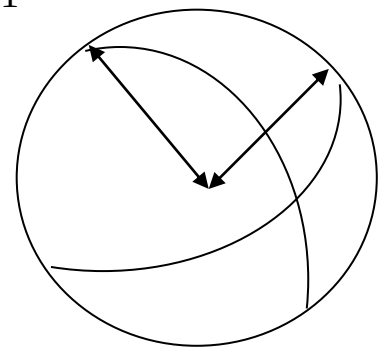
Example



Volume = L x B x H
= 9.1 x 3.2 x 3.8
= 110.656m³

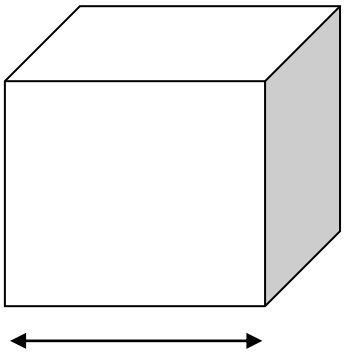
Surface Area = 2(L + B) x H
= 2(9.1 + 3.2) x 3.8
= 93.48m²

Q. 1



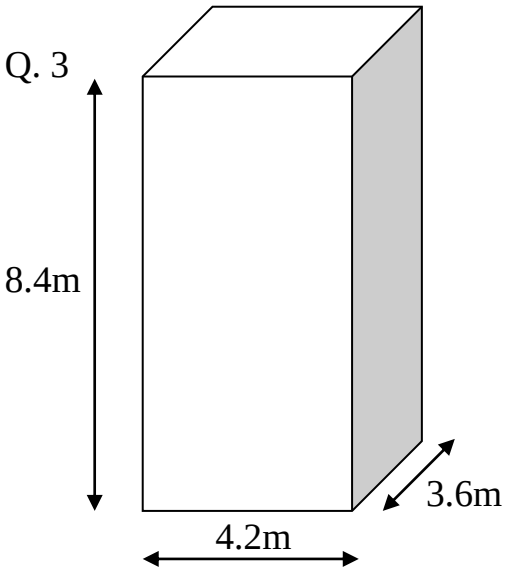
Radius = 2.5m

Q. 2

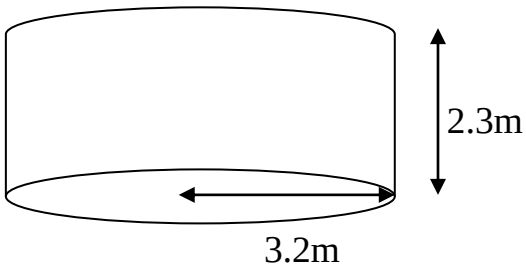


4.5m

Q. 3



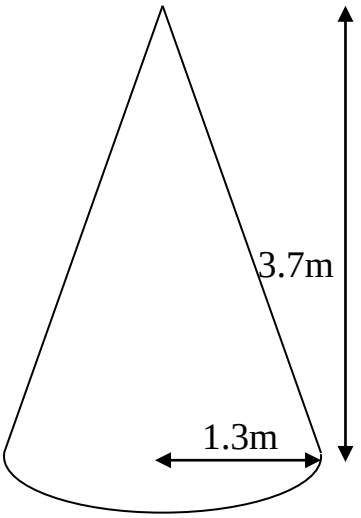
Q. 4



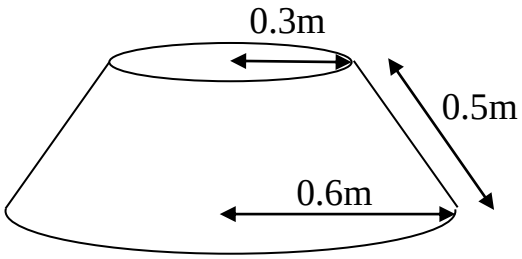
Volume and Surface Area (Continued)

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.

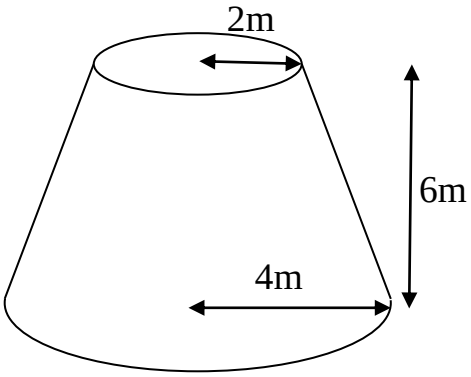
Q. 5



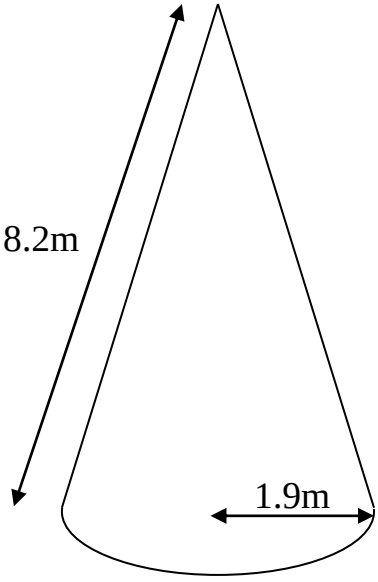
Q. 6



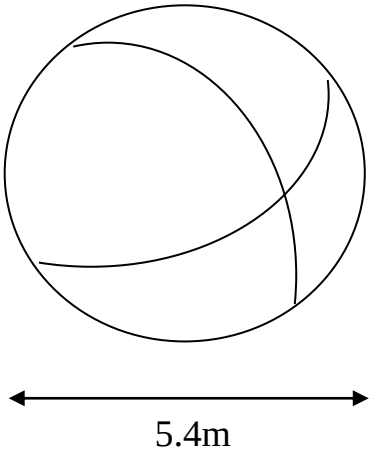
Q. 7



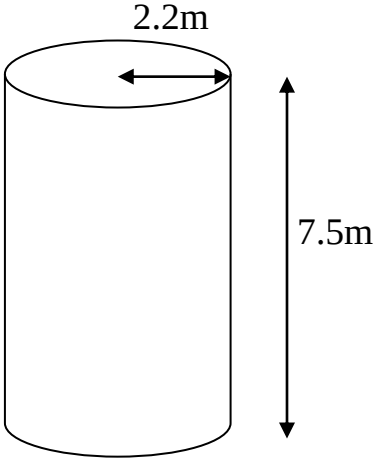
Q. 8



Q. 9



Q.10



Answers – Volume and Surface Area

Q. 1 Volume = $\frac{4\ \pi\ r^3}{3}$

$= \frac{4 \times \pi \times 2.5^3}{3}$

$= 65.45m^3$

Surface Area = $4\ \pi\ r^2$

Surface Area = $4 \times \pi \times 2.5^2$

$= 78.54m^2$

Q. 2 Volume = L^3

$= 4.5^3$

$= 91.125m^3$

Surface Area = $4(length^2)$

Surface Area = $4(4.5^2)$

$= 81m^2$

Q. 3 Volume = L x B X H

= 4.2 x 3.6 x 8.4

$= 127.008m^3$

Surface Area = { 2(L + B) } x H

Surface Area = { 2(4.2 + 3.6) } x 8.4

$= 131.04m^2$

Q. 4 Volume = $\pi\ r^2\ h$

$= \pi \times 3.2^2 \times 2.3$

$= 73.991m^3$

Surface Area = $2\ \pi\ r\ h$

Surface Area = $2 \times \pi \times 3.2 \times 2.3$

$= 46.244m^2$

Q. 5 Volume = $\frac{1}{3}\ \pi\ r^2\ h$

$= \frac{1}{3} \times \pi \times 1.3^2 \times 3.7$

$= 6.548m^3$

Surface Area = $\pi\ r\ l$ ***{ l = sloping length}***

(first we need to get l}

$a^2 + b^2 = c^2$

$1.3^2 + 3.7^2 = x^2$

$\sqrt{15.38}$ = **l = 3.922**

Surface Area = $\pi \times 1.3 \times 3.922$

$= 16.018m^2$

Q. 6 Volume = $\frac{1}{3}\ \pi\ h(R^2+\{Rr\}+r^2)$

(first we need to get h)

$a^2 = c^2 - b^2$

$x^2 = 0.5^2 - 0.3^2$

$x = \sqrt{0.16}$

h = 0.4m

Volume = $\frac{1}{3}\ \pi\ 0.4(0.6^2 +\{0.6x0.3\}+0.3^2)$

$= \frac{1}{3} \times \pi \times 0.4 \times 0.63$

$= 0.264m^3$

Surface Area = $\pi\ R\ L - \pi\ r\ l$

(for frustum we need to get full cone and take off the piece we don't have)

= (π x R x L) – (π x r x l)

= (π x 0.6 x 1.0) – (π x 0.3 x 0.5)

= 1.885 – 0.471

$= 1.414m^2$

Answers – Volume and Surface Area (Continued)

Q. 7 Volume = $\frac{1}{3}\pi h(R^2+\{Rr\}+r^2)$

Volume = $\frac{1}{3} \pi\ 6\ (4^2 + \{4 \times 2\} + 2^2)$

$= \frac{1}{3} \times \pi \times 6\ (28)$

$= 175.929m^3$

Surface Area = $\pi RL - \pi rl$

(first we need to get l}

$a^2 + b^2 = c^2$

$6^2 + 2^2 = x^2$

$\sqrt{40} = x$

l = 6.325m *(so L = 12.65m)*

Surface Area = $(\pi \times R \times L) – (\pi \times r \times l)$

$= (\pi \times 4 \times 12.65) – (\pi \times 2 \times 6.325)$

$= 158.965 – 39.741$

$= 119.224m^2$

Q. 8 Volume = $\frac{1}{3} \pi\ r^2\ h$

(first we need to get h)

$a^2 = c^2 - b^2$

$x^2 = 8.2^2 - 1.9^2$

$x = \sqrt{63.63}$

h = 7.979m

Volume = $\frac{1}{3} \times \pi \times 1.9^2 \times 7.979$

$= 30.164m^3$

Surface Area = $\pi\ r\ l$ ***{ l = sloping length}***

$= \pi \times 1.9 \times 8.2$

$= 48.946m^2$

Q. 9 ***(Radius is equal to half of diameter)***

Volume = $\frac{4\pi r^3}{3}$

$= \frac{4 \times \pi \times 2.7^3}{3}$

$= 82.448m^3$

Surface Area = $4\pi r^2$

Surface Area = $4 \times \pi \times 2.7^2$

$= 91.609m^2$

Q.10 Volume = $\pi r^2 h$

$= \pi \times 2.2^2 \times 7.5$

$= 114.040m^3$

Surface Area = $2\pi rh$

Surface Area = $2 \times \pi \times 2.2 \times 7.5$

$= 103.673m^2$