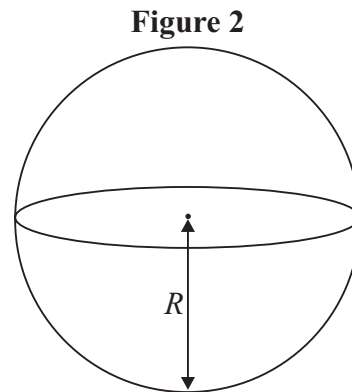
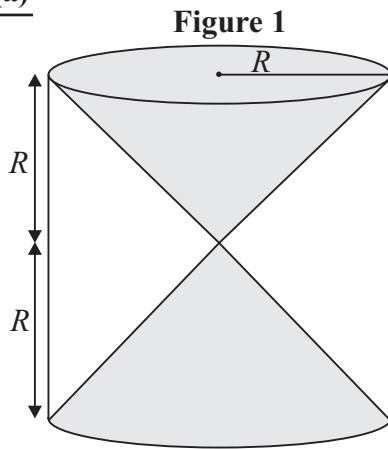


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QUESTION 7 (40 MARKS)

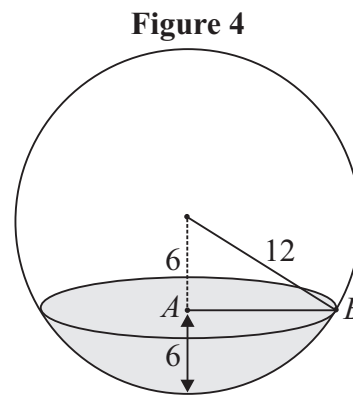
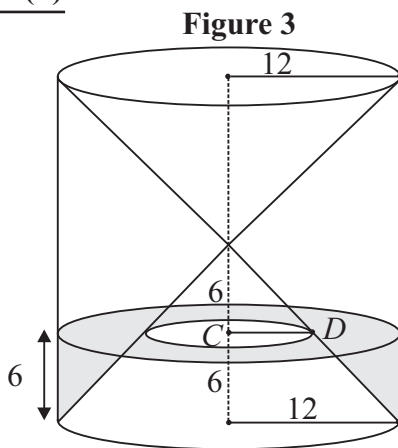
Question 7 (a)



Volume of empty space in cylinder
 = Volume of cylinder – 2(Volume of cone)
 $= \pi R^2 (2R) - 2\left(\frac{1}{3}\pi R^2 \times R\right)$
 $= 2\pi R^3 - \frac{2}{3}\pi R^3 = \frac{4}{3}\pi R^3$
 = Volume of sphere

Volume of cylinder = $\pi r^2 h$
 Volume of cone = $\frac{1}{3}\pi r^2 h$
 Volume of sphere = $\frac{4}{3}\pi r^3$

Question 7 (b)



- (i) $12^2 = 6^2 + |AB|^2$
 $|AB| = \sqrt{12^2 - 6^2} = 6\sqrt{3}$ cm
- (ii) There are two similar triangles in the cone.
 $\therefore \frac{|CD|}{12} = \frac{6}{12} \Rightarrow |CD| = 6$ cm

- (iii) Sphere: Area of surface of water
 $= \pi(6\sqrt{3})^2 = 108\pi$ cm²
- Cylinder: Area of surface of water
 $= \pi(12)^2 - \pi(6)^2 = 108\pi$ cm²

Question 7 (c)

Volume of cylinder under water = $\frac{1}{3}\pi(12)^2(12) - \frac{1}{3}\pi(6)^2(6) = 504\pi$ cm³
 Volume of water in cylinder = $\pi(12)^2(6) - 504\pi = 360\pi$ cm³
 = Volume of water in sphere

