

Foundation GCSE: Volume

Name: _____

Class: _____

Instructions: Answer all questions. Questions are ordered from easiest (1) to hardest (15). Working out should be shown where appropriate.

1. Calculate the volume of a cube with side length 5 cm.
2. Calculate the volume of a cuboid measuring 8 cm by 4 cm by 3 cm.
3. A cylinder has a radius of 3 cm and a height of 10 cm. Calculate its volume, using $\pi \approx 3.14$.
4. Calculate the volume of a triangular prism with a cross-sectional area of 24 cm^2 and a length of 7 cm.
5. A cylinder has a diameter of 10 cm and a height of 12 cm. Calculate its volume, using $\pi \approx 3.14$, giving your answer to 1 decimal place.
6. Calculate the volume of a cuboid with dimensions 1.5 m, 2 m, and 4 m.
7. A square-based pyramid has a base side of 6 cm and a vertical height of 10 cm. Calculate its volume.
8. A cone has a base radius of 4 cm and a vertical height of 9 cm. Calculate its volume, using $\pi \approx 3.14$, giving your answer to 1 decimal place.
9. A swimming pool is 25 m long, 10 m wide, and has a uniform depth of 2 m. Calculate its volume in cubic metres.
10. A metallic pipe has an outer radius of 5 cm, an inner radius of 3 cm, and a length of 20 cm. Calculate the volume of metal used, using $\pi \approx 3.14$.
11. A hemispherical bowl has a radius of 6 cm. Calculate its volume, using $\pi \approx 3.14$, giving your answer to 1 decimal place.
12. A triangular prism has a base triangle with base 8 cm and height 5 cm, and a length of 12 cm. Calculate its volume.
13. A storage box has an internal volume of 1500 cm^3 . If its base area is 125 cm^2 , calculate its height.
14. A compound solid consists of a cuboid ($10 \text{ cm} \times 6 \text{ cm} \times 4 \text{ cm}$) with a cylinder of radius 2 cm and height 4 cm removed from it. Calculate the remaining volume, using $\pi \approx 3.14$, giving your answer to 1 decimal place.
15. An algebraic cylinder has a radius of x cm and a height of 5 cm. If its volume is $45\pi \text{ cm}^3$, calculate the exact value of x .

Answers & Worked Solutions

1. 125 cm^3 : Volume $= 5^3 = 125$.
2. 96 cm^3 : Volume $= 8 \times 4 \times 3 = 96$.
3. 282.6 cm^3 : Volume $= 3.14 \times 3^2 \times 10 = 282.6$.
4. 168 cm^3 : Volume $= \text{Area} \times \text{length} = 24 \times 7 = 168$.
5. 942.0 cm^3 : Radius $= 5$; Volume $= 3.14 \times 5^2 \times 12 = 942.0$.
6. 12 m^3 : Volume $= 1.5 \times 2 \times 4 = 12$.
7. 120 cm^3 : Pyramid volume $= \frac{1}{3} \times \text{base area} \times \text{height} = \frac{1}{3} \times 6^2 \times 10 = 120$.
8. 150.7 cm^3 : Cone volume $= \frac{1}{3} \times 3.14 \times 4^2 \times 9 = 150.72 \approx 150.7$.
9. 500 m^3 : Volume $= 25 \times 10 \times 2 = 500$.
10. 1004.8 cm^3 : Cross-section area $= 3.14 \times (5^2 - 3^2) = 3.14 \times 16 = 50.24$; Volume $= 50.24 \times 20 = 1004.8$.
11. 452.2 cm^3 : Hemisphere volume $= \frac{2}{3} \times 3.14 \times 6^3 = 452.16 \approx 452.2$.
12. 240 cm^3 : Cross-section area $= \frac{1}{2} \times 8 \times 5 = 20$; Volume $= 20 \times 12 = 240$.
13. 12 cm : Height $= \text{Volume} \div \text{base area} = 1500 \div 125 = 12$.
14. 189.8 cm^3 : Cuboid volume $= 240$; Cylinder volume $= 3.14 \times 2^2 \times 4 = 50.24$; Remaining $= 240 - 50.24 = 189.76 \approx 189.8$.
15. 3 : $\pi x^2 \times 5 = 45\pi \implies 5x^2 = 45 \implies x^2 = 9 \implies x = 3$.