

Volume of a Cylinder Worksheet

Name: _____ Date: _____

$V = \pi r^2 h$ · $V = \pi d^2 h \div 4$ · $h = V \div (\pi r^2)$ · $r = \sqrt{V \div \pi h}$ · $1,000 \text{ cm}^3 = 1 \text{ L}$ · $1 \text{ m}^3 = 1,000 \text{ L}$ · $231 \text{ in}^3 = 1 \text{ US gal}$. Round to 2 decimal places unless told otherwise.

Level 1: Radius and height

1. $r = 4 \text{ cm}$, $h = 10 \text{ cm}$. Find the volume.
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2. $r = 6 \text{ cm}$, $h = 15 \text{ cm}$. Find the volume.
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3. $r = 2.5 \text{ m}$, $h = 8 \text{ m}$. Find the volume.
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4. $r = 10 \text{ in}$, $h = 3 \text{ in}$. Find the volume.
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5. $r = 7 \text{ cm}$, $h = 20 \text{ cm}$. Use $\pi = 22/7$.
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Level 2: Diameter and units

6. $d = 12 \text{ cm}$, $h = 25 \text{ cm}$. Find the volume.
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7. $d = 1.4 \text{ m}$, $h = 2 \text{ m}$. Find the volume in m^3 .
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8. $r = 30 \text{ cm}$, $h = 1.5 \text{ m}$. Find the volume in m^3 and in litres.
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9. $d = 8 \text{ in}$, $h = 2 \text{ ft}$. Find the volume in in^3 and in US gallons.
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10. $d = 50 \text{ mm}$, $h = 12 \text{ cm}$. Find the volume in ml.
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Level 3: Word problems

11. A water tank has a diameter of 1.5 m and a height of 2 m. How many litres does it hold?
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12. A well with a diameter of 1.2 m is dug 14 m deep. How many m^3 of earth are removed?
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13. A can ($r = 3.5 \text{ cm}$, $h = 12 \text{ cm}$) is filled to 90%. How many ml of soup go in?
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14. A water main has an inside diameter of 20 cm and a length of 50 m. How many litres fill it?

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15. A rain barrel ($d = 60$ cm, $h = 90$ cm) fills how many full 10-litre buckets?

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Level 4: Reverse problems

16. $V = 1,000 \text{ cm}^3$, $r = 5 \text{ cm}$. Find h .

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17. $V = 500 \text{ cm}^3$, $h = 10 \text{ cm}$. Find r .

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18. $V = 2 \text{ m}^3$, $d = 1 \text{ m}$. Find h .

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19. A 300-litre tank must be 1 m tall. Find the diameter.

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GCSE style

A. G1. $r = 4.5 \text{ cm}$, $h = 12 \text{ cm}$. Work out the volume to 3 significant figures. (2 marks)

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B. G2. $r = 3 \text{ cm}$, $h = 8 \text{ cm}$. Work out the volume in terms of π . (2 marks)

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C. G3. $V = 600 \text{ cm}^3$, $h = 15 \text{ cm}$. Work out the radius to 1 decimal place. (3 marks)

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Class 8 / 9 style (use $\pi = 22/7$)

A. C1. A tank has $r = 1.4 \text{ m}$ and $h = 3 \text{ m}$. How many litres can it hold?

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B. C2. The curved surface area of a cylinder is 88 cm^2 and its height is 14 cm . Find its volume.

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C. C3. A pillar has a diameter of 50 cm and a height of 3.5 m . Find the volume of concrete.

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Grade 7 style (use $\pi \approx 3.14$)

A. A1. A juice can has $r = 2 \text{ in}$ and $h = 5 \text{ in}$. Find its volume.

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B. A2. A round paddling pool has $d = 12 \text{ ft}$ and a depth of 4 ft . Find its volume.

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C. A3. A cup has $d = 8 \text{ cm}$ and $h = 10 \text{ cm}$. How many ml does it hold?

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Level 1

1. $160\pi \approx 502.65 \text{ cm}^3$
2. $540\pi \approx 1,696.46 \text{ cm}^3$
3. $50\pi \approx 157.08 \text{ m}^3$
4. $300\pi \approx 942.48 \text{ in}^3$
5. $22/7 \times 49 \times 20 = 3,080 \text{ cm}^3$

Level 2

6. $r = 6$: $900\pi \approx 2,827.43 \text{ cm}^3$
7. $r = 0.7$: $0.98\pi \approx 3.08 \text{ m}^3$
8. $r = 0.3 \text{ m}$: $0.135\pi \approx 0.424 \text{ m}^3 = 424.1 \text{ L}$
9. $h = 24 \text{ in}$, $r = 4$: $384\pi \approx 1,206.37 \text{ in}^3 = 5.22 \text{ US gal}$
10. $r = 2.5 \text{ cm}$: $75\pi \approx 235.62 \text{ ml}$

Level 3

11. $\pi \times 0.75^2 \times 2 \approx 3.534 \text{ m}^3 = 3,534 \text{ L}$
12. $\pi \times 0.6^2 \times 14 = 5.04\pi \approx 15.83 \text{ m}^3$
13. $147\pi \approx 461.81 \text{ cm}^3$; $90\% \approx 415.6 \text{ ml}$
14. $\pi \times 0.1^2 \times 50 \approx 1.571 \text{ m}^3 = 1,571 \text{ L}$
15. $\pi \times 30^2 \times 90 \approx 254.5 \text{ L} \rightarrow 25 \text{ buckets}$

Level 4

16. $1,000 \div 25\pi \approx 12.73 \text{ cm}$
17. $\sqrt{500 \div 10\pi} \approx 3.99 \text{ cm}$
18. $2 \div 0.25\pi \approx 2.55 \text{ m}$
19. $r = \sqrt{0.3 \div \pi} \approx 0.309 \text{ m}$; $d \approx 0.618 \text{ m}$

Exam questions

- A. G1. $243\pi \approx 763 \text{ cm}^3$ (3 s.f.)
- B. G2. $72\pi \text{ cm}^3$
- C. G3. $r^2 = 600 \div 15\pi \approx 12.73$; $r \approx 3.6 \text{ cm}$
- D. C1. $18.48 \text{ m}^3 = 18,480 \text{ L}$
- E. C2. $r = 1 \text{ cm}$; $V = 44 \text{ cm}^3$
- F. C3. 0.6875 m^3
- G. A1. 62.8 in^3
- H. A2. 452.16 ft^3
- I. A3. 502.4 ml