Volumes - Lesson 3

Volume of a Cylinder - Non-Calculator
(given radius and height)

LI

- Calculate the Volume of a Cylinder without using a calculator.

SC

- Cylinder formula.

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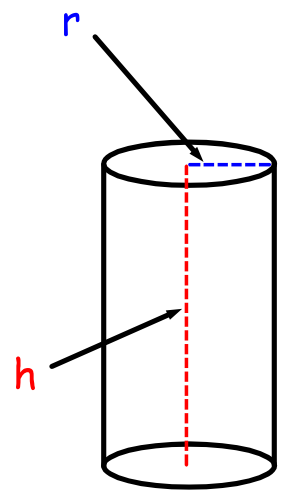
Volume of a Cylinder

$$V = \pi r^2 h$$



(r is radius of circle, h is height)

Remember, r^2 means $r \times r$

$$V = \pi \times r \times r \times h$$

Example 1

Calculate the volume of a cylinder of radius 10 cm and height 7 cm.

Take $\pi = 3.14$.

$$V = \pi \times r^2 \times h$$

$$V = 3.14 \times 10^2 \times 7$$

$$V = 3.14 \times 100 \times 7$$

$$V = 314 \times 7$$

$$\boxed{V = 2\,198 \text{ cm}^3}$$

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Example 2

Calculate the volume of a cylinder of radius 20 cm and height 2 cm.

Take $\pi = 3.14$.

$$V = \pi \times r^2 \times h$$

$$V = 3.14 \times 20^2 \times 2$$

$$V = 3.14 \times 400 \times 2$$

$$V = 314 \times 8$$

$$\boxed{V = 2\,512 \text{ cm}^3}$$

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Example 3

Calculate the exact volume (meaning leave your answer in terms of π) of a cylinder of radius 5 cm and height 4 cm.

$$V = \pi \times r^2 \times h$$

$$V = \pi \times 5^2 \times 4$$

$$V = \pi \times 25 \times 4$$

$$V = \pi \times 100$$

$$\boxed{V = 100\pi \text{ cm}^3}$$

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Example 4

Calculate the exact volume (meaning leave your answer in terms of π) of a cylinder of radius 4 cm and height 3 cm.

$$V = \pi \times r^2 \times h$$

$$V = \pi \times 4^2 \times 3$$

$$V = \pi \times 16 \times 3$$

$$V = \pi \times 48$$

$$\boxed{V = 48\pi \text{ cm}^3}$$

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Calculate the volumes of these cylinders :

Take $\pi = 3.14$	Exact volume (answer in terms of π)
1) $r = 5$ cm, $h = 4$ cm	8) $r = 4$ cm, $h = 2$ cm
2) $r = 30$ cm, $h = 1$ cm	9) $r = 7$ cm, $h = 7$ cm
3) $r = 10$ cm, $h = 2$ cm	10) $r = 9$ cm, $h = 8$ cm
4) $r = 100$ cm, $h = 3$ cm	11) $r = 6$ cm, $h = 10$ cm
5) $r = 100$ cm, $h = 4$ cm	12) $r = 15$ cm, $h = 4$ cm
6) $r = 100$ cm, $h = 5$ cm	13) $r = 19$ cm, $h = 5$ cm
7) $r = 1\,000$ cm, $h = 2$ cm	14) $r = 21$ cm, $h = 3$ cm

Answers

Take $\pi = 3.14$	Exact volume (answer in terms of π)
1) 314 cm^3	8) 32π cm^3
2) 2 826 cm^3	9) 343π cm^3
3) 628 cm^3	10) 648π cm^3
4) 94 200 cm^3	11) 360π cm^3
5) 125 600 cm^3	12) 900π cm^3
6) 157 000 cm^3	13) $1\,805\pi$ cm^3
7) 6 280 000 cm^3	14) $1\,323\pi$ cm^3