## Volumes - Lesson 7 <br> Volume of a Cone - Non-Calculator

LI

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

SC

- Cone formula.


# Volume of a Cone 


( $r$ is radius of circle, $h$ is height)


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

$$
V=\pi \times r \times r \times h \div 3
$$

## Example 1

Calculate the volume of a cone of radius 10 cm and height 6 cm .

Take $\pi=3.14$.

$$
\begin{aligned}
& V=\pi \times r^{2} \times h \div 3 \\
& V=3.14 \times 10^{2} \times 6 \div 3 \\
& V=3.14 \times 100 \times 2 \\
& V=314 \times 2 \\
& V=628 \mathrm{~cm}^{3}
\end{aligned}
$$

## Example 2

Calculate the volume of a cone of radius 20 cm and height 3 cm .

Take $\pi=3.14$.

$$
\begin{aligned}
& V=\pi \times r^{2} \times h \div 3 \\
& V=3.14 \times 20^{2} \times 3 \div 3 \\
& V=3.14 \times 400 \times 1 \\
& V=314 \times 4 \\
& V=1256 \mathrm{~cm}^{3}
\end{aligned}
$$

## Example 3

Calculate the exact volume (meaning leave your answer in terms of $\pi$ ) of a cone of radius 5 cm and height 9 cm .

$$
\begin{aligned}
& V=\pi \times r^{2} \times h \div 3 \\
& V=\pi \times 5^{2} \times 9 \div 3 \\
& V=\pi \times 25 \times 3 \\
& V=\pi \times 75 \\
& V=75 \pi \mathrm{~cm}^{3}
\end{aligned}
$$

## Example 4

Calculate the exact volume (meaning leave your answer in terms of $\pi$ ) of a cone of radius 4 cm and height 5 cm .

$$
\begin{aligned}
& V=\pi \times r^{2} \times h \div 3 \\
& V=\pi \times 4^{2} \times 5 \div 3 \\
& V=\pi \times 16 \times 5 \div 3 \\
& V=\pi \times 80 \div 3 \\
& V=80 \pi / 3 \mathrm{~cm}^{3}
\end{aligned}
$$

Calculate the volumes of these cones:

| Take $\pi=3.14$ | Exact volume (answer in terms of $\pi$ ) |
| :--- | :--- |
| 1) $r=2 \mathrm{~cm}, \mathrm{~h}=3 \mathrm{~cm}$ | 8) $r=6 \mathrm{~cm}, \mathrm{~h}=3 \mathrm{~cm}$ |
| 2) $r=10 \mathrm{~cm}, \mathrm{~h}=3 \mathrm{~cm}$ | 9) $r=3 \mathrm{~cm}, \mathrm{~h}=12 \mathrm{~cm}$ |
| 3) $r=30 \mathrm{~cm}, \mathrm{~h}=1 \mathrm{~cm}$ | 10) $r=7 \mathrm{~cm}, \mathrm{~h}=2 \mathrm{~cm}$ |
| 4) $r=30 \mathrm{~cm}, \mathrm{~h}=2 \mathrm{~cm}$ | 11) $r=8 \mathrm{~cm}, \mathrm{~h}=4 \mathrm{~cm}$ |
| 5) $r=100 \mathrm{~cm}, \mathrm{~h}=6 \mathrm{~cm}$ | 12) $r=11 \mathrm{~cm}, \mathrm{~h}=6 \mathrm{~cm}$ |
| 6) $r=1000 \mathrm{~cm}, \mathrm{~h}=6 \mathrm{~cm}$ | 13) $r=12 \mathrm{~cm}, \mathrm{~h}=9 \mathrm{~cm}$ |
| 7) $r=100 \mathrm{~cm}, \mathrm{~h}=9 \mathrm{~cm}$ | 14) $r=20 \mathrm{~cm}, \mathrm{~h}=5 \mathrm{~cm}$ |


| Answers |  |  |
| :--- | :--- | :---: |
| Take $\pi=3.14$ |  |  |
| 1) $12.56 \mathrm{~cm}^{3}$ | Exact volume (answer in terms of $\pi$ ) |  |
| 2) $314 \mathrm{~cm}^{3}$ | 8) $36 \pi \mathrm{~cm}^{3}$ |  |
| 3) $942 \mathrm{~cm}^{3}$ | 9) $36 \pi \mathrm{~cm}^{3}$ |  |
| 4) $1884 \mathrm{~cm}^{3}$ | 10) $98 \pi / 3 \mathrm{~cm}^{3}$ |  |
| 5) $62800 \mathrm{~cm}^{3}$ | 11) $256 \pi / 3 \mathrm{~cm}^{3}$ |  |
| 6) $6280000 \mathrm{~cm}^{3}$ | 12) $242 \pi \mathrm{~cm}^{3}$ |  |
| 7) $94200 \mathrm{~cm}^{3}$ | 13) $432 \pi \mathrm{~cm}^{3}$ |  |
|  | 14) $2000 \pi / 3 \mathrm{~cm}^{3}$ |  |

