

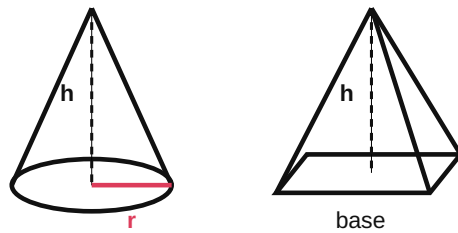
Boost Free Lessons - Year 10 Maths

Lesson 18: Volumes of Pyramids and Cones

Name: _____ Grade: _____ Date: _____

Worked Example 1

Find the volume of a cone with radius 6 cm and height 10 cm. Use $\pi \approx 3.14$.



1. A cone holds exactly one third of the cylinder with the same base and height, so $V = \frac{1}{3} \pi r^2 h$.
2. Find the base area first: $\pi r^2 = 3.14 \times 36 = 113.04$.
3. Multiply by the height: $113.04 \times 10 = 1\,130.4$.
4. Now take one third: $1\,130.4 \div 3 = 376.8$.

$V \approx 376.8 \text{ cm}^3$

Worked Example 2

Find the volume of a square pyramid with a base side of 9 m and a height of 12 m.

1. A pyramid is one third of the prism with the same base and height, so $V = \frac{1}{3} \times \text{base area} \times \text{height}$.
2. The base is a square: $9 \times 9 = 81 \text{ m}^2$.
3. Multiply by the height: $81 \times 12 = 972$.
4. Take one third: $972 \div 3 = 324$.

$V = 324 \text{ m}^3$

Remember: Both cones and pyramids are exactly **one third** of the cylinder or prism with the same base and height. Find the base area first, multiply by the height, then divide by 3.



Question 1: Find the volume of each cone. Use $\pi \approx 3.14$ and round to 1 decimal place.

1. Cone: $r = 3$ cm, $h = 6$ cm

2. Cone: $r = 5$ cm, $h = 12$ cm

3. Cone: $r = 2$ cm, $h = 9$ cm

4. Cone: $r = 4$ cm, $h = 15$ cm

5. Cone: $r = 10$ cm, $h = 3$ cm

6. Cone: $r = 6$ cm, $h = 7$ cm

7. Cone: $r = 1$ cm, $h = 12$ cm

8. Cone: $r = 8$ cm, $h = 9$ cm



Question 2: Answer the following questions.

1. Square pyramid, base side 6 m, height 10 m.
2. Square pyramid, base side 12 cm, height 9 cm.
3. Rectangular pyramid, base 8 cm by 5 cm, height 6 cm.
4. Square pyramid, base side 3 m, height 4 m.
5. A cone and a cylinder both have $r = 5$ and $h = 6$. How many times larger is the cylinder?
6. A pyramid has a volume of 200 cm^3 and a base area of 50 cm^2 . Find its height.



Question 3: Answer the following questions. Use $\pi \approx 3.14$.

1. An ice cream cone has radius 3 cm and height 11 cm. Find its volume.
2. A pyramid-shaped tent has a square base of side 4 m and a height of 3 m. Find its volume.
3. A conical pile of sand has radius 2 m and height 1.5 m. Find its volume.
4. A cone has a volume of 100 cm^3 and a height of 12 cm. Find its base area.
5. The Great Pyramid of Giza has a square base of side 230 m and a height of 147 m. Find its volume.





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Answers: Volumes of Pyramids and Cones**Question 1**

- | | |
|--------------------------|--------------------------|
| 1. 56.5 cm ³ | 5. 314.0 cm ³ |
| 2. 314.0 cm ³ | 6. 263.8 cm ³ |
| 3. 37.7 cm ³ | 7. 12.6 cm ³ |
| 4. 251.2 cm ³ | 8. 602.9 cm ³ |

Question 2

- | | |
|------------------------|----------------------|
| 1. 120 m ³ | 4. 12 m ³ |
| 2. 432 cm ³ | 5. 3 times |
| 3. 80 cm ³ | 6. h = 12 cm |

Question 3

1. 103.6 cm³
2. 16 m³
3. 6.28 m³
4. 25 cm²
5. 2 592 100 m³

