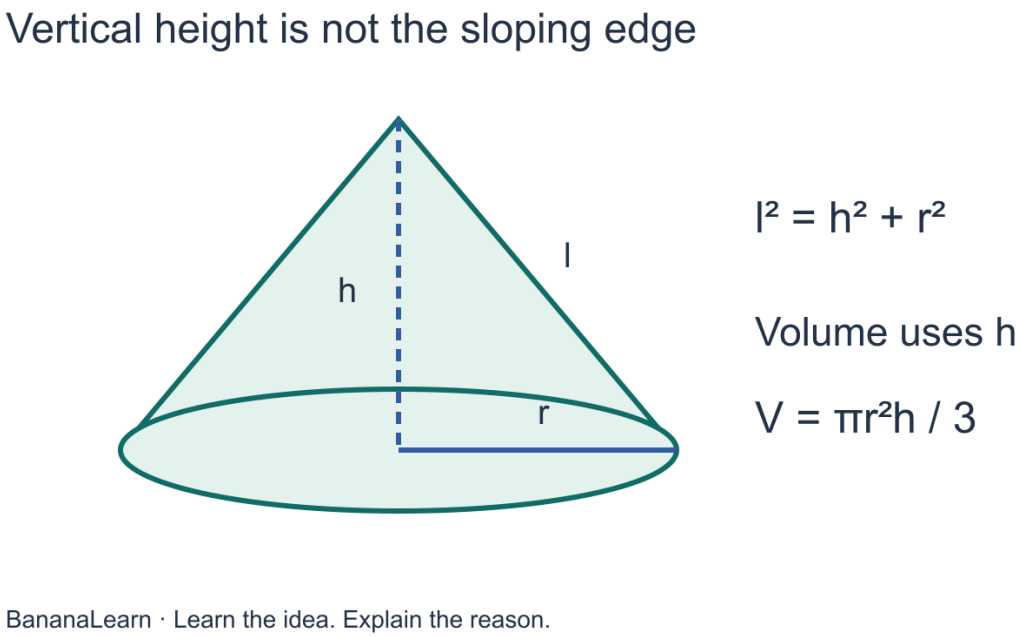
Cone volume: vertical height is not slant height

Grade 9 · Practice and answer pack

A cone-shaped cup has a sloping side and a straight height down its middle. Choosing the sloping length for its volume makes the cup seem larger than it is.

The volume of a right circular cone is $V = (1/3)\pi r^2 h$, where h is the perpendicular height. The slant height l runs along the side; for a right cone, $l^2 = r^2 + h^2$.

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The cone's vertical height, radius and slant height form a right triangle. Volume uses vertical height.

Matching complete guide

bananalearn.com/learn/grade-9-cone-volume-and-slant-height.html

Try before looking at the answers

Name (optional): _____ Date: _____

Show your method or explain your choice. Work through a short group at a time. Questions are original practice, not a complete syllabus assessment.

1. r = 2 cm, h = 9 cm: exact volume?

2. r = 6 cm, h = 8 cm: slant height?

3. Same r and h: cone versus cylinder volume?

4. Double height only: effect on cone volume?

5. Double radius only: effect on volume?

6. r=4 cm, h=9 cm: exact volume?

7. r=8 cm, l=17 cm: height?

8. $V=75\pi$ cm³ and $h=9$ cm: radius?

9. Diameter 6 cm, height 10 cm: volume?

10. All dimensions triple: volume factor?

11. $r=20$ mm, $h=6$ cm: volume in cm³?

12. Could $r=6$ cm and $l=5$ cm describe a right cone?

13. Which uses slant height: volume or curved surface area?

Answers and reasoning

Compare the explanation as well as the answer. If a method is unclear, revisit the matching guide and try a changed example.

1. r = 2 cm, h = 9 cm: exact volume?

12π cm³

(1/3) × π × 4 × 9.

2. r = 6 cm, h = 8 cm: slant height?

10 cm

√(36 + 64) = 10.

3. Same r and h: cone versus cylinder volume?

Cone is one third

Both use the same base area and height.

4. Double height only: effect on cone volume?

Volume doubles

The formula is directly proportional to h.

5. Double radius only: effect on volume?

Volume becomes four times as large

The radius is squared.

6. r=4 cm, h=9 cm: exact volume?

48π cm³

π×16×9/3.

7. r=8 cm, l=17 cm: height?

15 cm

√(289−64)=15.

8. V=75π cm³ and h=9 cm: radius?

5 cm

$r^2=3\times75/9=25$.

9. Diameter 6 cm, height 10 cm: volume?

30π cm³

Use radius 3, not 6.

10. All dimensions triple: volume factor?

27

$3^3=27$.

11. r=20 mm, h=6 cm: volume in cm³?

8π cm³

20 mm=2 cm.

12. Could r=6 cm and l=5 cm describe a right cone?

No

The slant height is the hypotenuse and must exceed the radius.

13. Which uses slant height: volume or curved surface area?

Curved surface area

πrl uses l; volume uses perpendicular h.

Check understanding

• Is your height perpendicular or sloping?

• Did you halve a given diameter?

• Are you measuring space, capacity or covering material?