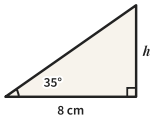
Trigonometry and volume

ANSWERS

1

This triangle is the cross-section of a prism 20 cm long. Find the volume of the prism to 1 decimal place.



$h =$ 8 × tan 35° $=$ 5.60

$V =$ ½ × 8 × 5.60 × 20

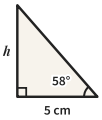
$V =$ 448.1 cm³

448.1 cm³

Answer

2

A cone has a radius of 5 cm. Its slant side is at 58° to the base. Find the volume of the cone to 1 decimal place.



$h =$ 5 × tan 58° $=$ 8.00

$V =$ ⅓ × π × 5² × 8.00

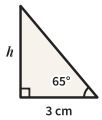
$V =$ 209.5 cm³

209.5 cm³

Answer

3

A square based pyramid has a base of side 6 cm. The line from the middle of a base edge to the top is at 65° to the base.
Find the volume to 1 decimal place.



$h =$ 3 × tan 65° $=$ 6.43

$V =$ ⅓ × 6² × 6.43

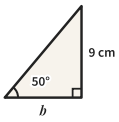
$V =$ 77.2 cm³

77.2 cm³

Answer

4

This triangle is the cross-section of a prism 15 cm long. Find the volume of the prism to 1 decimal place.



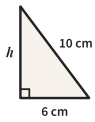
$V =$ 509.8 cm³

509.8 cm³

Answer

5

A cone has a radius of 6 cm and a slant height of 10 cm. Find its volume.
Give your answer to 1 decimal place.



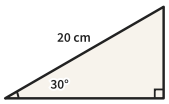
$h = \sqrt{(10^2 - 6^2)} = 8$; ⅓ × π × 6² × 8

301.6 cm³

Answer

6

A cylinder is cut in half from top to bottom. The cut face is a rectangle whose diagonal is 20 cm, at 30° to the base.
Find the volume to 1 decimal place.



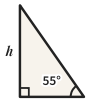
diameter 20 cos 30° = 17.32, height 20 sin 30° = 10

2356.2 cm³

Answer

7

A square based pyramid has a base of side 8 cm. Each sloping edge is at 55° to the base. Find the volume to 1 decimal place.



half the diagonal $\sqrt{(4^2 + 4^2)} = 5.66$; $h = 5.66 \tan 55°$

172.3 cm³

Answer

8

A prism is 10 cm long and has a volume of 300 cm³. Its cross-section is a right angled triangle with a base of 6 cm. Find the angle θ to 1 decimal place.



area 30 cm², so the height is 10 cm; tan $\theta = 10 \div 6$

59.0°

Answer

Trigonometry and volume *further practice*

ANSWERS

9

A cone is 12 cm tall. The angle between its slant side and its central axis is 25°.
Find its volume to 1 decimal place.

radius = 12 × tan 25° = 5.60

393.5 cm³

Answer

10

A tent is a prism 3 m long. Its front is an isosceles triangle with sloping sides of 2 m, each at 60° to the ground.
Find the volume of the tent to 1 decimal place.

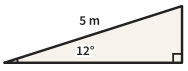
height 2 sin 60° = 1.73, base 2 × 2 cos 60° = 2

5.2 m³

Answer

11

A wooden ramp is a prism 2 m wide. Its sloping top is 5 m long and makes an angle of 12° with the floor.
Find the volume of the ramp to 1 decimal place.



height 5 sin 12°, base 5 cos 12°

5.1 m³

Answer

12

A square based pyramid has a base of side 10 cm and a volume of 200 cm³.
Find the angle between the base and the line from the middle of a base edge to the top.

height 200 × 3 ÷ 100 = 6 cm; tan $\theta = 6 \div 5$

50.2°

Answer

13

A cylinder is cut through its centre from top to bottom. The cut face is a rectangle whose diagonal is 15 cm long and makes 40° with the base. Find the volume of the cylinder to 1 decimal place.

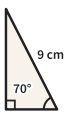
diameter 15 cos 40° = 11.49, height 15 sin 40° = 9.64

999.9 cm³

Answer

14

A cone has a slant height of 9 cm.
The slant side makes an angle of 70° with the base. Find the volume of the cone to 1 decimal place.



radius 9 cos 70° = 3.08, height 9 sin 70° = 8.46

83.9 cm³

Answer

15

A prism is 12 cm long. Its cross-section is a triangle with sides of 7 cm and 9 cm and an angle of 48° between them.
Find the volume to 1 decimal place.

area = ½ × 7 × 9 × sin 48°

280.9 cm³

Answer

16

A cone has a radius of 4 cm and a slant height of 5 cm. Sam works out its volume as ⅓ × π × 4² × 5. Explain his mistake and find the volume.

5 cm is the slant height, not the height: the height is $\sqrt{(5^2 - 4^2)} = 3$

50.3 cm³

Answer