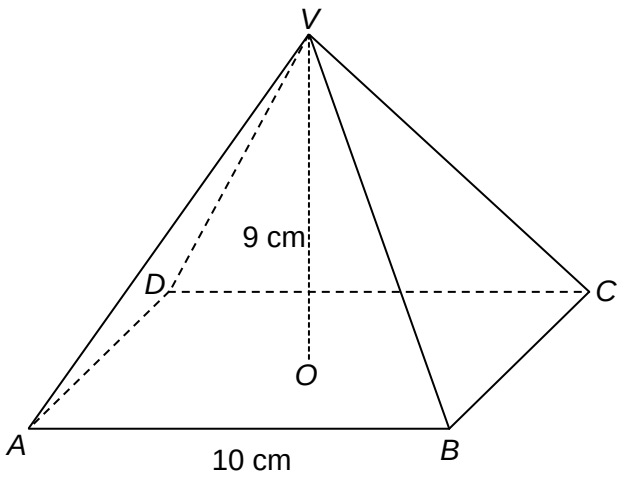
SCAN ME

Volume and Surface Area of Pyramids

REVISE THIS TOPIC

1 *VABCD* is a squared-based pyramid.
VO is the perpendicular height of the pyramid.



Volume of pyramid = $\frac{1}{3}$ × area of base × perpendicular height

Work out the volume of the pyramid. **[2 marks]**

$\frac{1}{3} \times 10 \times 10 \times 9$

$= \frac{1}{3} \times 900$

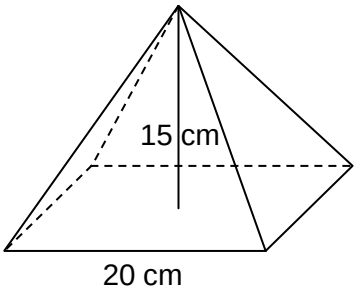
$= 300$

Answer 300 cm^3

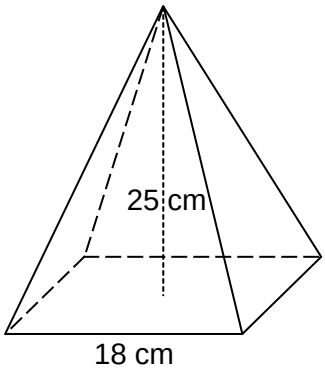
2

2 Here are two square based pyramids.

Pyramid A



Pyramid B



Volume of pyramid = $\frac{1}{3}$ × area of base × perpendicular height

The volume of **Pyramid A** is less than the volume of **Pyramid B**.

Work out how much less.

[4 marks]

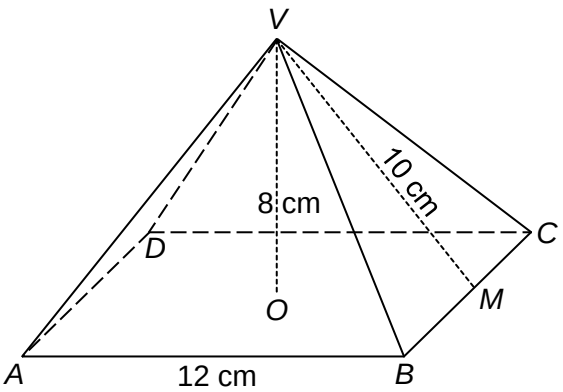
$\frac{1}{3} \times 20 \times 20 \times 15 = 2000$

$\frac{1}{3} \times 18 \times 18 \times 25 = 2700$

$2700 - 2000 = 700$

Answer 700 cm^3

3 *VABCD* is a squared-based pyramid.
VO is the perpendicular height of the pyramid.
M is the midpoint of *BC*.



Volume of pyramid = $\frac{1}{3}$ × area of base × perpendicular height

3 (a) Work out the volume of the pyramid. **[2 marks]**

$\frac{1}{3} \times 12 \times 12 \times 8 = 384$

Answer 384 cm^3

3 (b) Work out the surface area of the pyramid. **[4 marks]**

$12 \times 12 = 144$
$\frac{1}{2} \times 12 \times 10 = 60$
$60 \times 4 = 240$

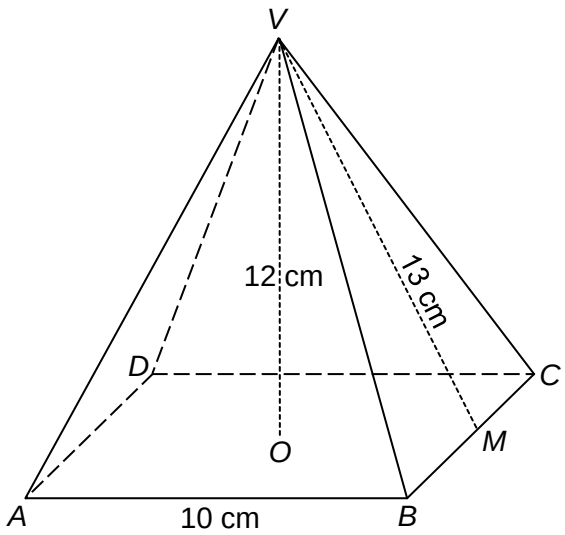
$240 + 144 = 384$

Answer 384 cm^2

10

Volume of pyramid = $\frac{1}{3}$ × area of base × perpendicular height

4 *VABCD* is a squared-based pyramid.
VO is the perpendicular height of the pyramid.
M is the midpoint of *BC*.



4 (a) Work out the volume of the pyramid. **[2 marks]**

$\frac{1}{3} \times 10 \times 10 \times 12 = 400$

Answer 400 cm^3

4 (b) Work out the surface area of the pyramid. **[4 marks]**

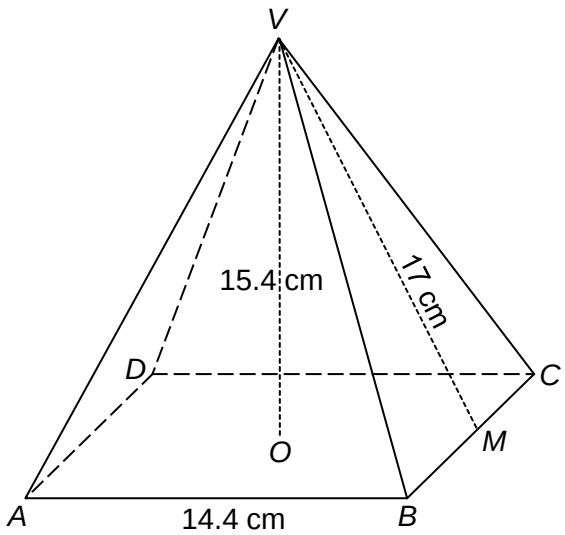
$10 \times 10 = 100$
$\frac{1}{2} \times 10 \times 13 = 65$
$65 \times 4 = 260$

$260 + 100 = 360$

Answer 360 cm^2

Volume of pyramid = $\frac{1}{3}$ × area of base × perpendicular height

5 *VABCD* is a squared-based pyramid.
VO is the perpendicular height of the pyramid.
M is the midpoint of *BC*.



5 (a) Work out the volume of the pyramid.
Give your answer to the nearest integer. **[2 marks]**

$\frac{1}{3} \times 14.4 \times 14.4 \times 15.4 = 1064.448$

Answer 1064 cm^3

5 (b) Work out the surface area of the pyramid.
Give your answer to the nearest integer. **[4 marks]**

$14.4 \times 14.4 = 207.36$
$\frac{1}{2} \times 14.4 \times 17 = 122.4$
$122.4 \times 4 = 489.6$
$489.6 + 207.36 = 696.96$

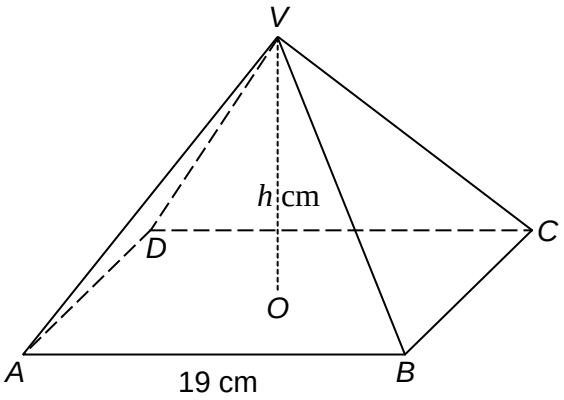
Answer 697 cm^2

12

Turn over ►

Volume of pyramid = $\frac{1}{3}$ × area of base × perpendicular height

6 *VABCD* is a squared-based pyramid.



The volume of the pyramid is 1500 cm^3

Work out the value of h, the perpendicular height of the pyramid.
Give your answer to 1 decimal place.

[3 marks]

$\frac{1}{3} \times 19 \times 19 \times h = 1500$

$\frac{361h}{3} = 1500$ (×3 / ÷3)

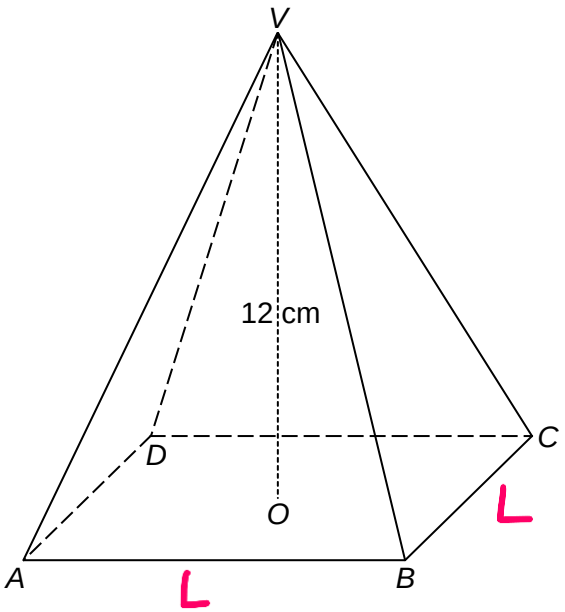
$361h = 4500$ (÷361)

$h = 12.46537\ldots$

$h =$ 12.5 cm

Volume of pyramid = $\frac{1}{3}$ × area of base × perpendicular height

7 *VABCD* is a squared-based pyramid.
VO is the perpendicular height of the pyramid.



The volume of the pyramid is 300 cm^3

Work out the length of side *AB*.
Give your answer to 1 decimal place. **[4 marks]**

$\frac{1}{3} \times L \times L \times 12 = 300$

$4L^2 = 300$

$L^2 = 75$

$L = \sqrt{75}$

$L = 8.66025...$

Answer 8.7 cm

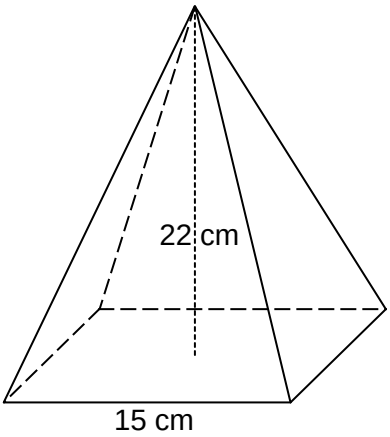
7

Turn over ►

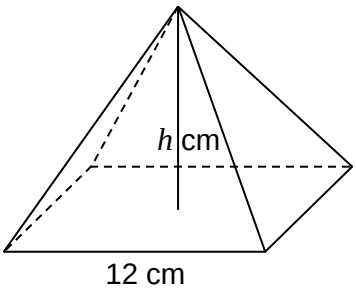
Volume of pyramid = $\frac{1}{3}$ × area of base × perpendicular height

8 Here are two square based pyramids.

Pyramid A



Pyramid B



Volume of **Pyramid A** = 2 × Volume of **Pyramid B**

Work out the value of h, the perpendicular height of **Pyramid B**.
Give your answer to 1 decimal place. **[5 marks]**

$\frac{1}{3} \times 15 \times 15 \times 22 = 1650$

$1650 \div 2 = 825$

$\frac{1}{3} \times 12 \times 12 \times h = 825$

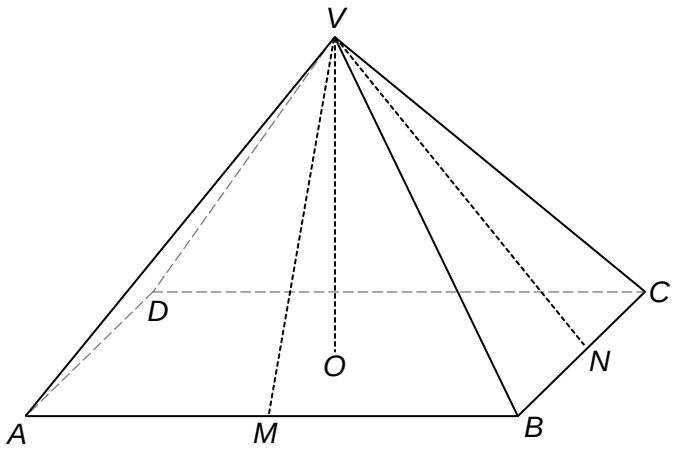
$48h = 825$

$h = 17.1875$

$h =$ 17.2 cm

Volume of pyramid = $\frac{1}{3}$ × area of base × perpendicular height

9 Here *VABCD* is a pyramid with rectangular base *ABCD*.
VO is the perpendicular height of the pyramid.
M is the midpoint of *AB*.
N is the midpoint of *BC*.



VA = *VB* = *VC* = *VD*

AB = 36 cm
BC = 14 cm
VO = 24 cm
VM = 25 cm
VN = 30 cm

Volume of pyramid = $\frac{1}{3}$ × area of base × perpendicular height

9 (a) Work out the volume of the pyramid. **[2 marks]**

$\frac{1}{3} \times 36 \times 14 \times 24 = 4032$

Answer 4032 cm^3

2

Turn over ►

Volume of pyramid = $\frac{1}{3}$ × area of base × perpendicular height

9 (b) Work out the surface area of the pyramid. **[4 marks]**

$36 \times 14 = 504$

$\frac{1}{2} \times 36 \times 25 = 450$

$\frac{1}{2} \times 14 \times 30 = 210$

$504 + 450 + 450 + 210 + 210 = 1824$

Answer 1824 cm^2

4