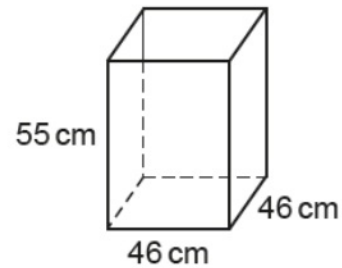


G61(H)- Pythagoras in 3D

OCR

- 18 Alvin has a crate in the shape of a cuboid.
The crate is open at the top.
The internal dimensions of the crate are 46 cm long by 46 cm wide by 55 cm high.

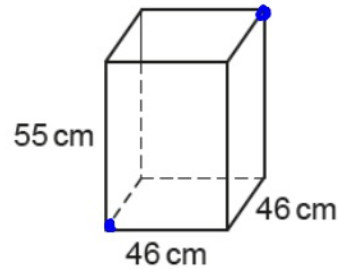


Alvin has a stick of length 95 cm.
Alvin places the stick in the crate so that the shortest possible length extends out above the top of the crate.

- (a) Calculate the length of the stick that extends out of the crate.

(a) cm [4]

- 18 Alvin has a crate in the shape of a cuboid.
 The crate is open at the top.
 The internal dimensions of the crate are 46 cm long by 46 cm wide by 55 cm high.



Alvin has a stick of length 95 cm.
 Alvin places the stick in the crate so that the shortest possible length extends out above the top of the crate.

extended

$$95 - 85.188$$

- (a) Calculate the length of the stick that extends out of the crate.

G61

diagonal of cuboid --- $d^2 = a^2 + b^2 + c^2 =$

$$d^2 = 46^2 + 46^2 + 55^2$$

$$d^2 = 7257$$

$$d = \sqrt{7257}$$

$$d = 85.188$$

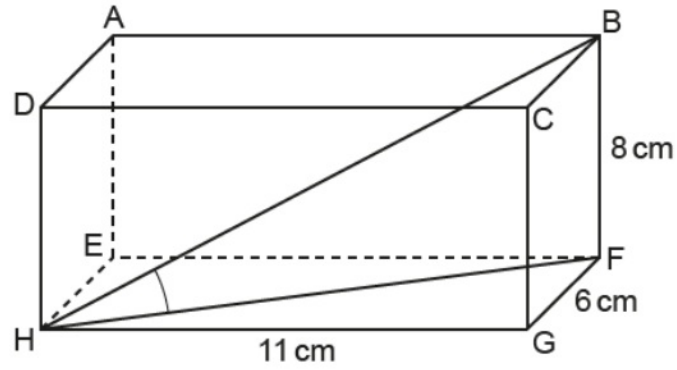
(a)

9.81

..... cm [4]

14 The diagram shows a cuboid ABCDEFGH.

G61
G62

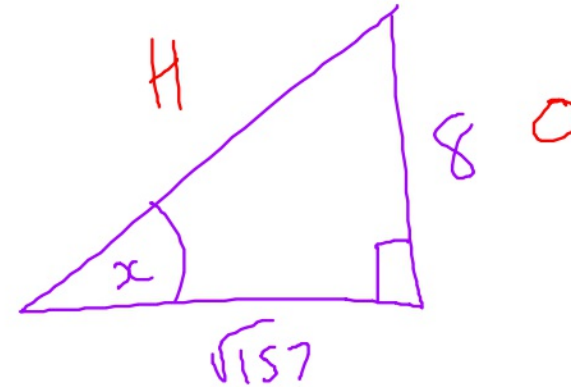
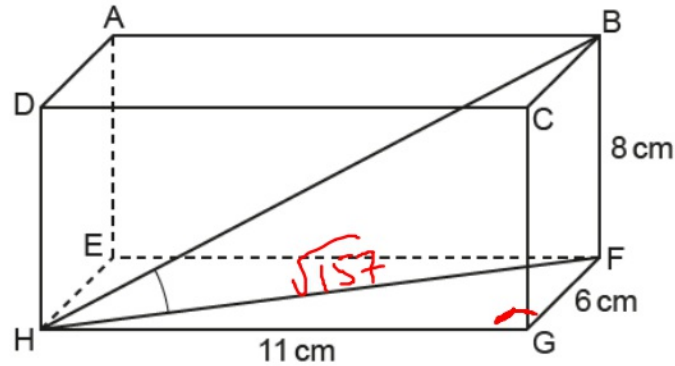


Calculate angle BHF.

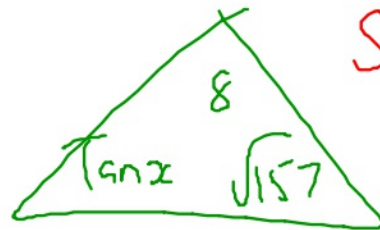
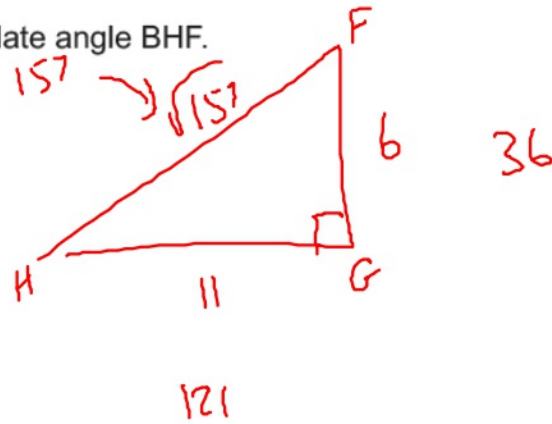
.....° [5]

14 The diagram shows a cuboid ABCDEFGH.

G61
G62



Calculate angle BHF.



$\overset{\circ}{S}H \overset{\circ}{C}H \overset{\circ}{T}A \checkmark$

$$\tan x = 0.638$$

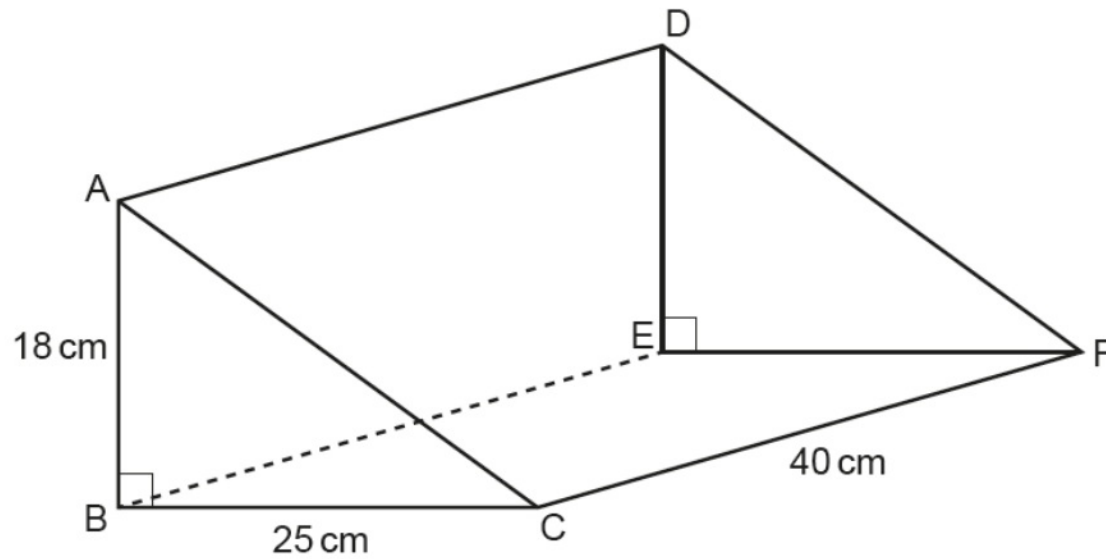
$$x = \tan^{-1} 0.638$$

$$32.55^{\circ} [5]$$

20 The diagram shows a right-angled triangular prism ABCDEF.

G61

G62



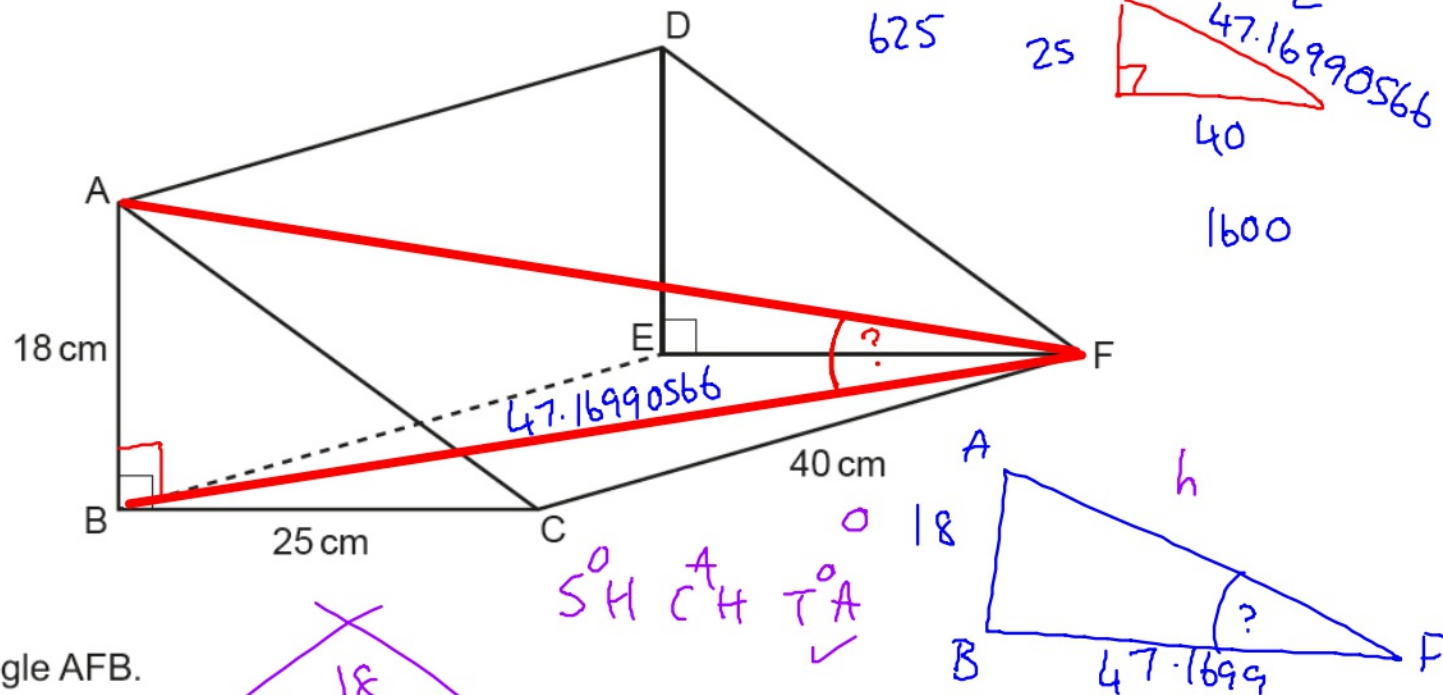
Calculate angle AFB.

..... ° [6]

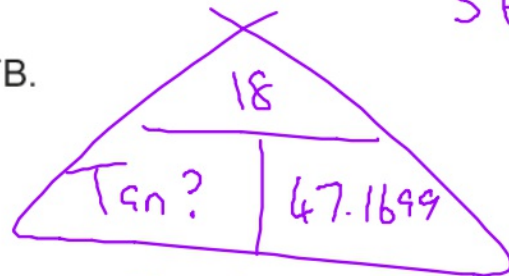
20 The diagram shows a right-angled triangular prism ABCDEF.

G61

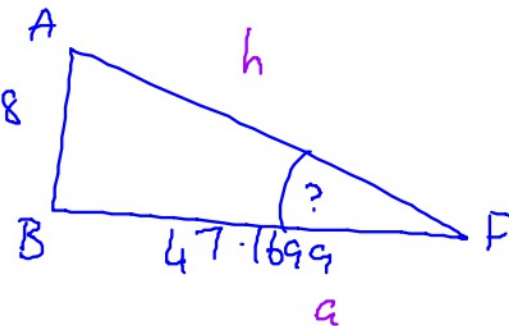
G62



Calculate angle AFB.



$$\begin{aligned} \text{Tan?} &= 0.38\dots \\ ? &= \text{Tan}^{-1} 0.38\dots \end{aligned}$$



$$20.9^\circ \text{ [6]} \checkmark$$

AQA

27

$VABCD$ is a square-based pyramid.

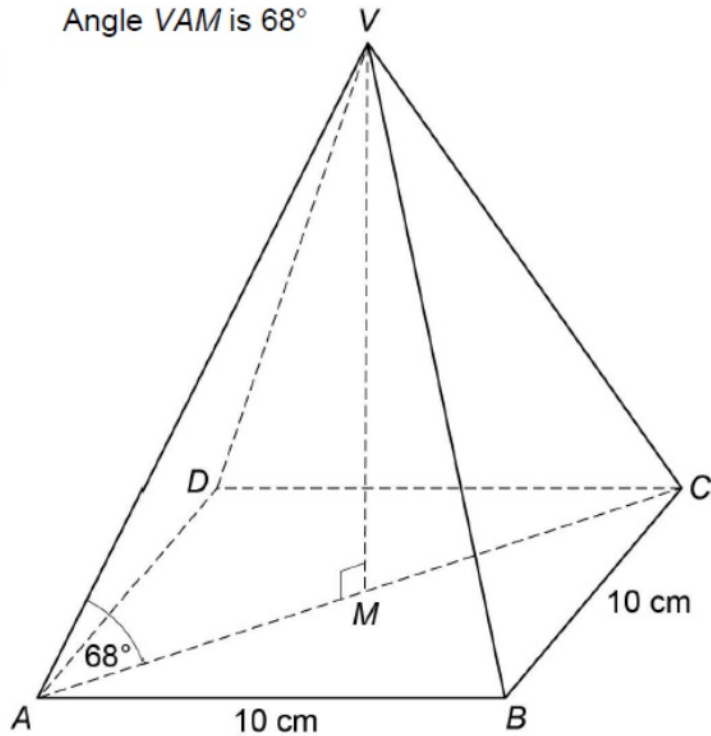
The horizontal base $ABCD$ has side length 10 cm and centre M .

G34 Angle VMA is 90°

G61 Angle VAM is 68°

G62

Work out the volume of the pyramid. [6 marks]



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

Answer _____ cm^3

27

VABCD is a square-based pyramid.

The horizontal base ABCD has side length 10 cm and centre M.

Work out the volume of the pyramid. [6 marks]

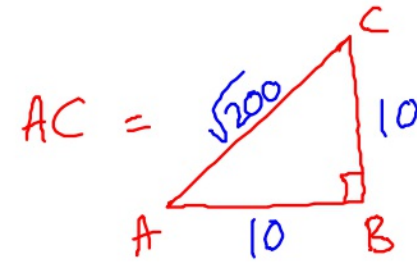
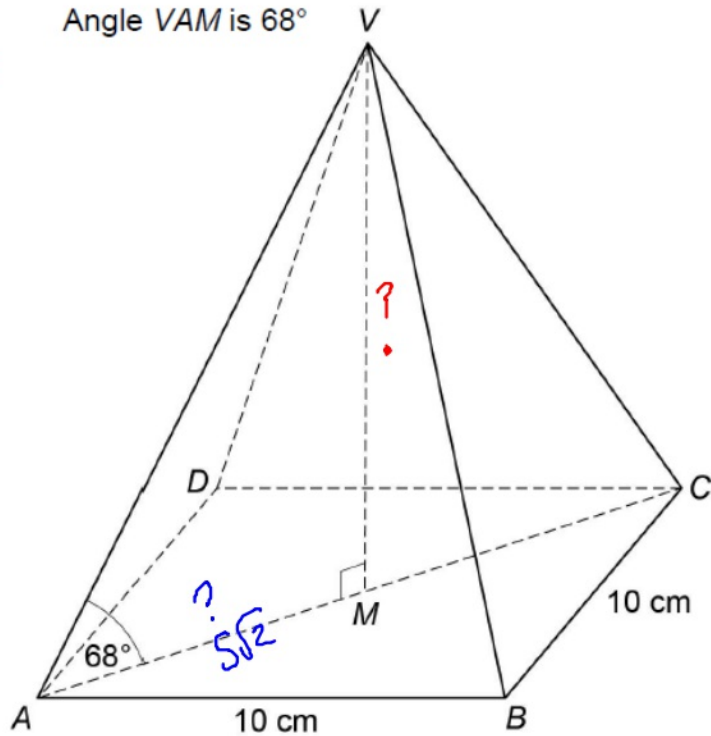
G34

Angle VMA is 90°

G61

Angle VAM is 68°

G62

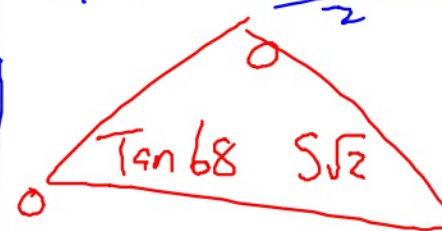
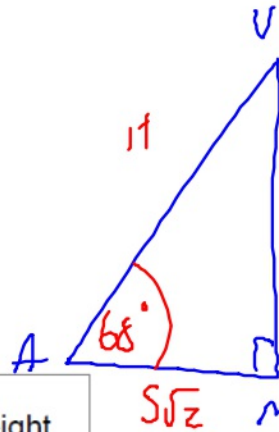


$$10^2 + 10^2 = AC^2$$

$$200 = AC^2$$

$$\sqrt{200} = AC$$

$$AM = \frac{\sqrt{200}}{2} = 5\sqrt{2}$$



$$h = VM = 17.50 \text{ cm}$$

$$\text{Vol} = \frac{1}{3} \times 100 \times 17.50 \dots$$

5\sqrt{2} M
A

Answer

583.38 ✓ cm³

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