

Pythagoras and Trigonometry in 3D

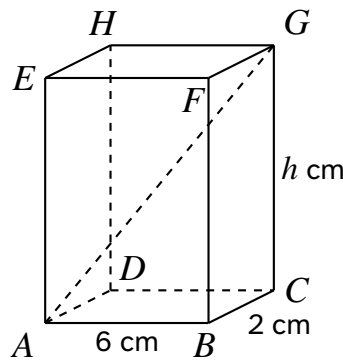
For AQA Level 2 Certificate in Further Mathematics (8365)

Name _____

Total marks: **27**

Answer **all** questions in the spaces provided. Show your working: marks are given for correct method. You may use a calculator.

- 1** $ABCDEFGH$ is a cuboid.



Not drawn accurately

$AB = 6 \text{ cm}$, $BC = 2 \text{ cm}$ and $CG = h \text{ cm}$

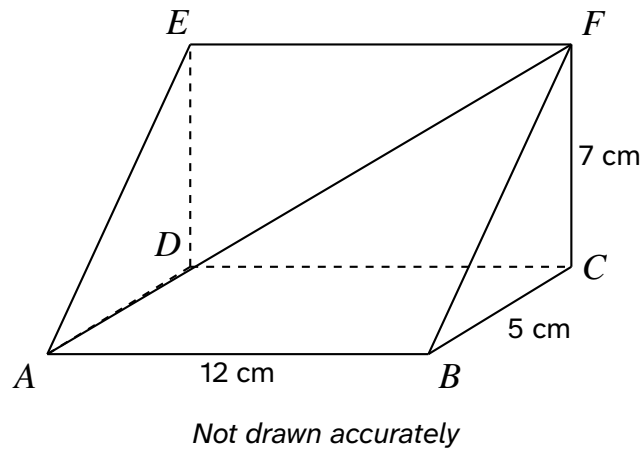
The diagonal $AG = 11 \text{ cm}$

Work out the value of h .

[2 marks]

$h =$ _____

- 2 The diagram shows a wedge.
The base $ABCD$ is a horizontal rectangle and the face $CDEF$ is a vertical rectangle.



- (a) Work out the length AF .

[2 marks]

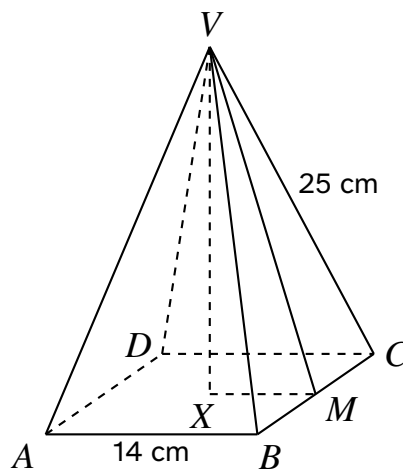
Answer _____ cm

- (b) Work out the angle between AF and the base $ABCD$.

[2 marks]

Answer _____ degrees

- 3** $VABCD$ is a pyramid with a square base $ABCD$ of side 14 cm.
 X is the centre of the base and V is vertically above X .
 Each sloping edge of the pyramid is 25 cm long.
 M is the midpoint of BC .



Not drawn accurately

- (a) Show that $VM = 24$ cm

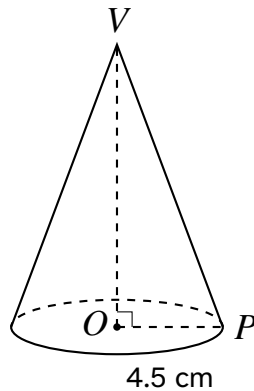
[2 marks]

- (b) Work out the angle between the face VBC and the base $ABCD$.

[2 marks]

Answer _____ degrees

- 4 The diagram shows a cone with vertex V .
 O is the centre of the base and P is a point on the edge of the base.
The radius of the base is 4.5 cm.



Not drawn accurately

The volume of the cone is $81\pi \text{ cm}^3$

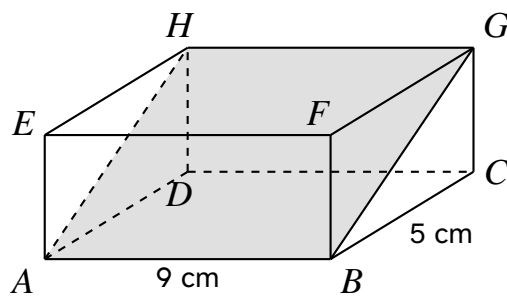
Work out the angle between the slant edge VP and the base of the cone.

[Volume of a cone = $\frac{1}{3}\pi r^2 h$, where r is the radius and h is the perpendicular height]

[4 marks]

Answer _____ degrees

- 5 $ABCDEFGH$ is a cuboid.
The rectangle $ABGH$ is shaded.



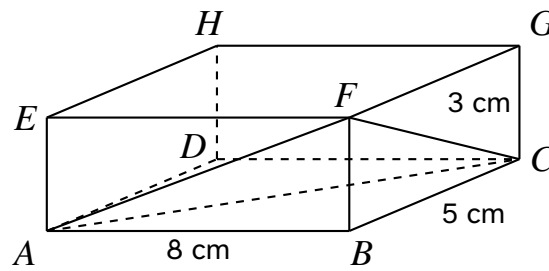
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The angle between the plane $ABGH$ and the base $ABCD$ is 38° .
Work out the area of the rectangle $ABGH$.

[3 marks]

Answer _____ cm^2

- 6 $ABCDEFGH$ is a cuboid.
Triangle AFC is drawn inside the cuboid.



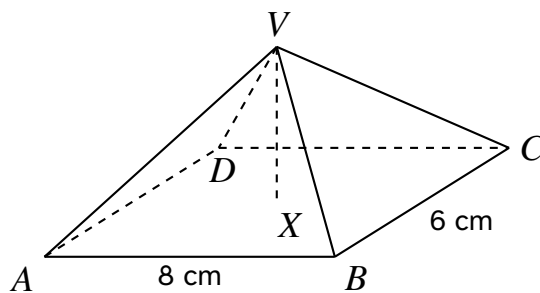
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Work out the size of angle AFC .

[5 marks]

Answer _____ degrees

- 7 $VABCD$ is a pyramid.
The base $ABCD$ is a horizontal rectangle.
 X is the centre of the base and V is vertically above X .



Not drawn accurately

The angle between the face VAB and the base $ABCD$ is 55°
Work out the angle between the edge VA and the base $ABCD$.

[5 marks]

Answer _____ degrees