

1MA1 Higher themed papers: 3D Trigonometry

Write your name here			
Surname	Other names		
Centre Number		Candidate Number	
Pearson Edexcel Level 1/Level 2 GCSE (9–1)			
Mathematics 3D Trigonometry			
			Paper Reference 1MA1
You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.			Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- You must **show all your working.**
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.

Information

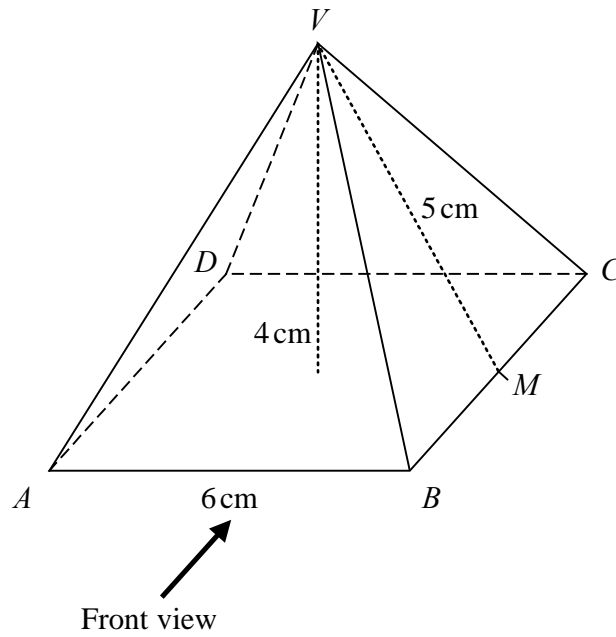
- The total mark for this paper is **31**. There are **7** questions.
- Questions have been arranged in an ascending order of mean difficulty, as found by all students in the June 2017–November 2019 examinations.
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

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1 Here is a solid square-based pyramid, $VABCD$.

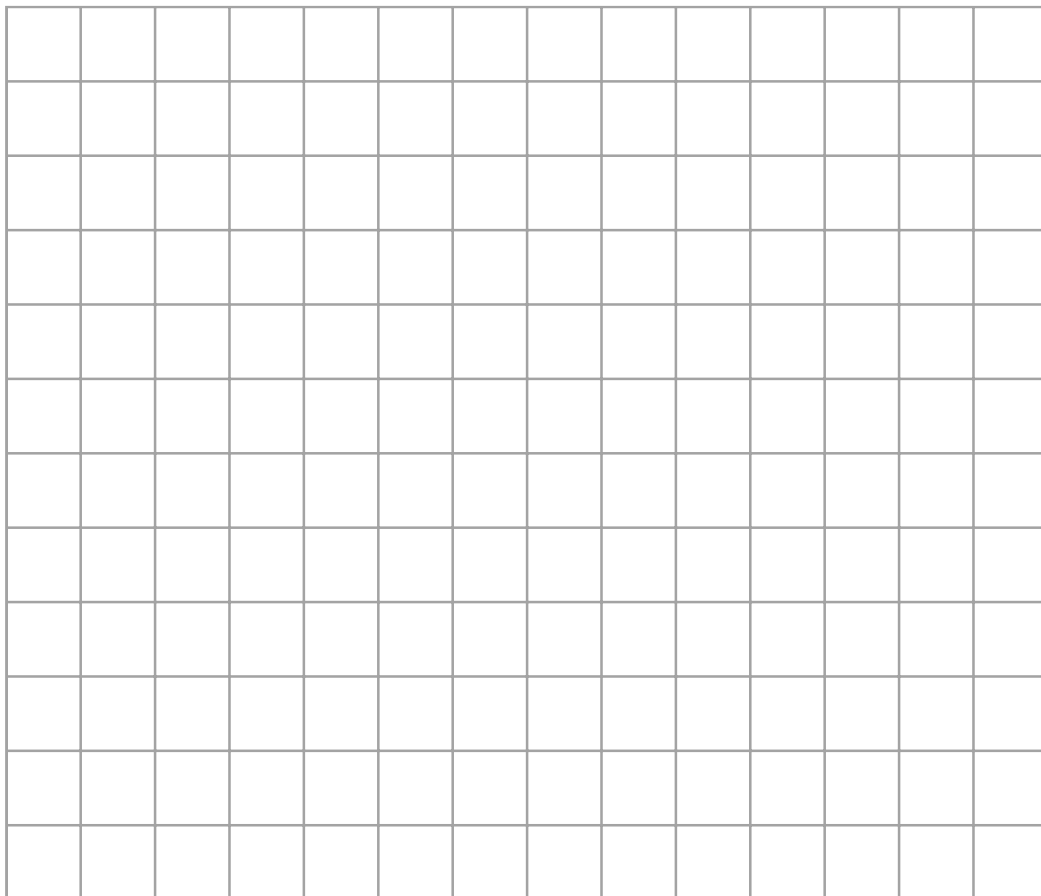


The base of the pyramid is a square of side 6 cm .

The height of the pyramid is 4 cm .

M is the midpoint of BC and $VM = 5\text{ cm}$.

(a) Draw an accurate front elevation of the pyramid from the direction of the arrow.



(2)

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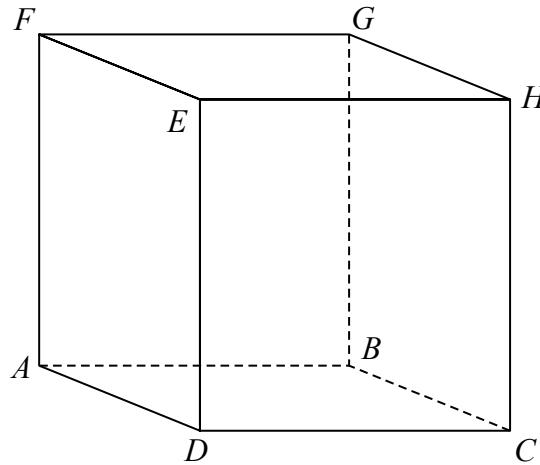
(b) Work out the total surface area of the pyramid.

.....
(4)

(Total for Question 1 is 6 marks)

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2 $ABCDEFGH$ is a cuboid.



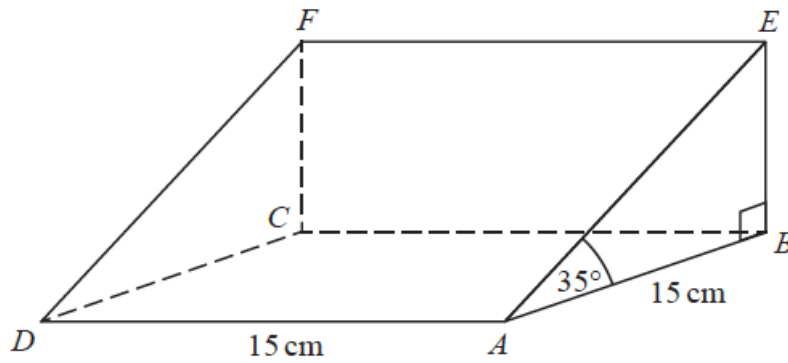
$AB = 7.3$ cm
 $CH = 8.1$ cm
Angle $BCA = 48^\circ$

Find the size of the angle between AH and the plane $ABCD$.
Give your answer correct to 1 decimal place.

.....^o
(Total for Question 2 is 4 marks)

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3 The diagram shows a triangular prism.



The base, $ABCD$, of the prism is a square of side length 15 cm.
 Angle ABE and angle CBE are right angles.
 Angle $EAB = 35^\circ$

M is the point on DA such that

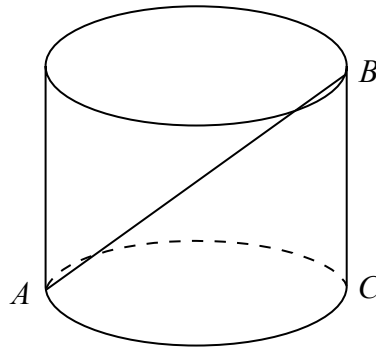
$$DM : MA = 2 : 3$$

Calculate the size of the angle between EM and the base of the prism.
 Give your answer correct to 1 decimal place.

..... °
(Total for Question 3 is 4 marks)

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- 4 The diagram shows a metal rod, AB , resting inside a cylindrical tin.



The tin is on a horizontal table.
 AC is a diameter of the base of the tin.
 B is on the top edge of the tin.
 BC is vertical.

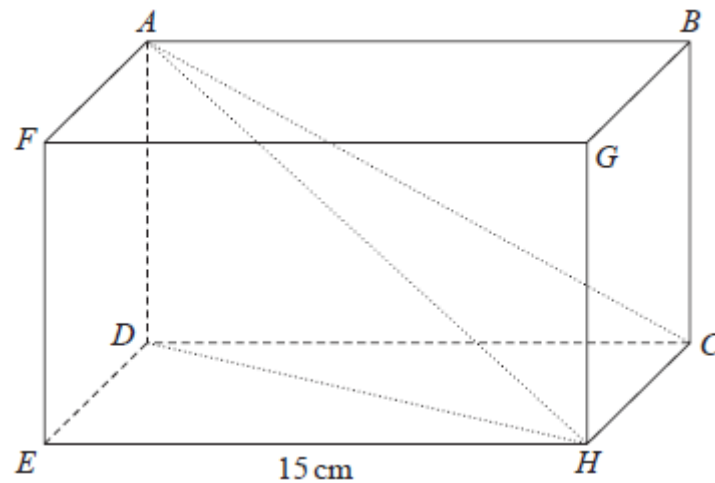
The radius of the base of the tin is 5 cm.
The volume of the tin is 1178 cm^3 .

Find the angle between the rod and the base of the tin.
Give your answer correct to the nearest degree.

.....°
(Total for Question 4 is 4 marks)

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5 $ABCDEFGH$ is a cuboid.



Angle $EDH = 64^\circ$

Angle $ACD = 28^\circ$

$EH = 15$ cm

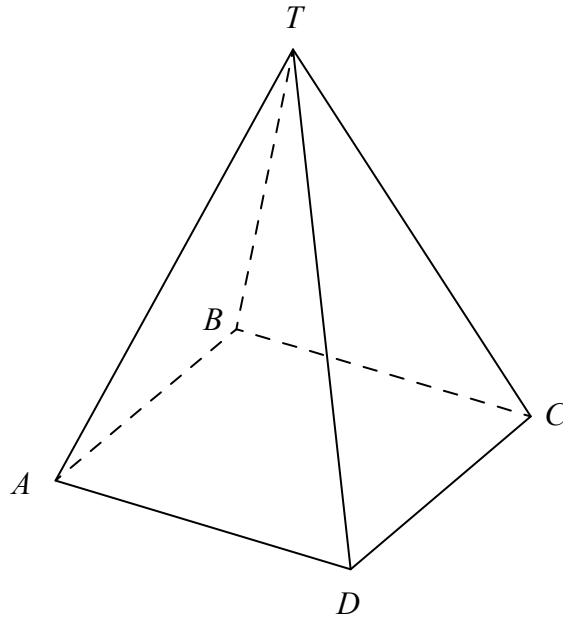
Work out the size of angle AHD .

Give your answer correct to 1 decimal place.

.....^o
(Total for Question 5 is 4 marks)

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- 6** Here is a pyramid with a square base $ABCD$.



$AB = 5 \text{ m}$

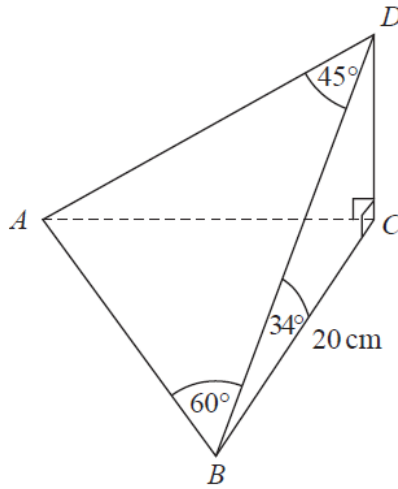
The vertex T is 12 m vertically above the midpoint of AC .

Calculate the size of angle TAC .

.....^o
(Total for Question 6 is 4 marks)

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7 The diagram shows a pyramid with base ABC .



CD is perpendicular to both CA and CB .

Angle $CBD = 34^\circ$ Angle $ADB = 45^\circ$ Angle $DBA = 60^\circ$
 $BC = 20$ cm.

Calculate the size of the angle between the line AD and the plane ABC .
Give your answer correct to 1 decimal place.

.....^o
(Total for Question 7 is 5 marks)

TOTAL MARKS FOR PAPER: 31