Write your name, centre number and candidate number in the boxes below.

Surname	Other names

Centre number | | | | | |

Candidate number | | | | |

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3-D Pythagoras and trigonometry

Time allowed: 1 hour 5 minutes

Subject code **0580**

Mathematics

Questions from Paper 2 and Paper 4

You must have: a ruler marked in centimetres and millimetres, a protractor, compasses, a pen, an HB pencil and an eraser.
You may use a calculator.

Total marks

/ 51

Instructions

- Answer every question in the space provided on this paper.
- Write in black or dark blue ink. Pencil may be used for diagrams and graphs.
- Fill in your name, centre number and candidate number above.
- Show your working: a correct method can earn marks even if the answer is wrong.
- Unless a question says otherwise, give answers that are not exact to 3 significant figures, and angles in degrees to 1 decimal place.

Information

- This paper has 10 questions worth 51 marks in total.
- The marks for each question or part are shown in brackets, for example [3].

Advice

- Read every question through once before you write anything.
- Use the marks in brackets to judge how long to spend on each part.
- If you finish early, go back and check your working.

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Print at 100% (Actual size) so diagrams keep their real measurements.

1 A cuboid measures 24 cm by 12 cm by 8 cm.

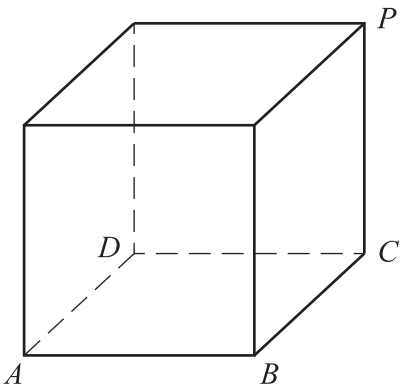
Calculate the length of a diagonal of the cuboid.

..... cm [3]

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2



NOT TO SCALE

The diagram shows a cube.

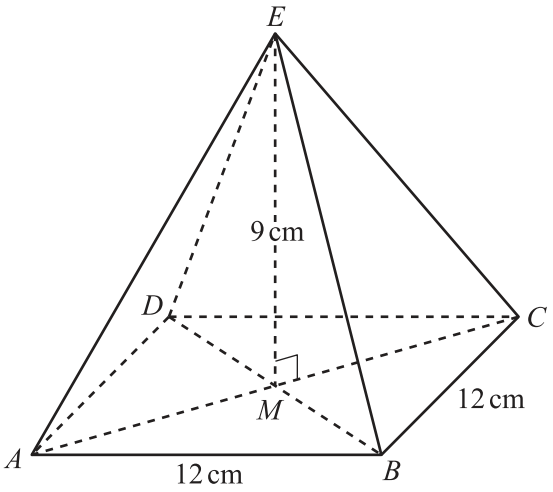
Calculate the angle between the diagonal AP and the base $ABCD$.

..... [4]

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3



NOT TO SCALE

The diagram shows a square-based pyramid $ABCDE$.
The diagonals of the square meet at M.
E is vertically above M.
$AB = BC = 12$ cm and $EM = 9$ cm.

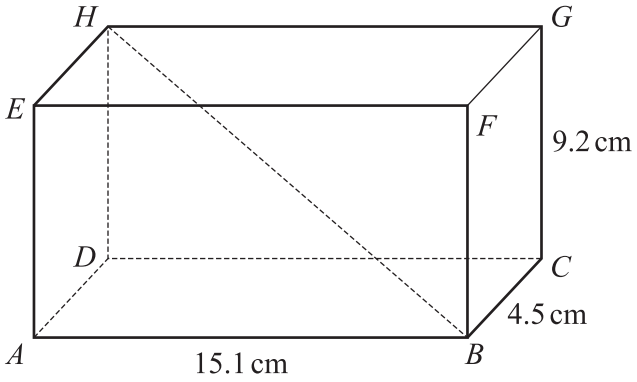
Calculate the angle between the edge EC and the base, $ABCD$, of the pyramid.

..... [4]

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4



NOT TO SCALE

The diagram shows a cuboid $ABCDEFGH$.
$AB = 15.1$ cm, $BC = 4.5$ cm and $CG = 9.2$ cm.

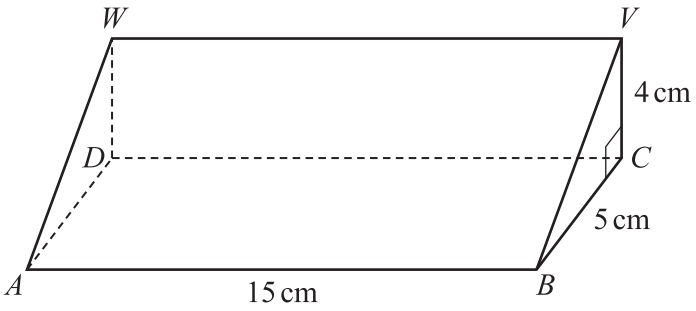
Calculate the angle that the diagonal BH makes with the face $ADHE$.

..... [4]

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5



NOT TO SCALE

The diagram shows a triangular prism with cross-section triangle BCV.
Angle $BCV = 90°$, $BC = 5\,\text{cm}$, $CV = 4\,\text{cm}$ and $AB = 15\,\text{cm}$.

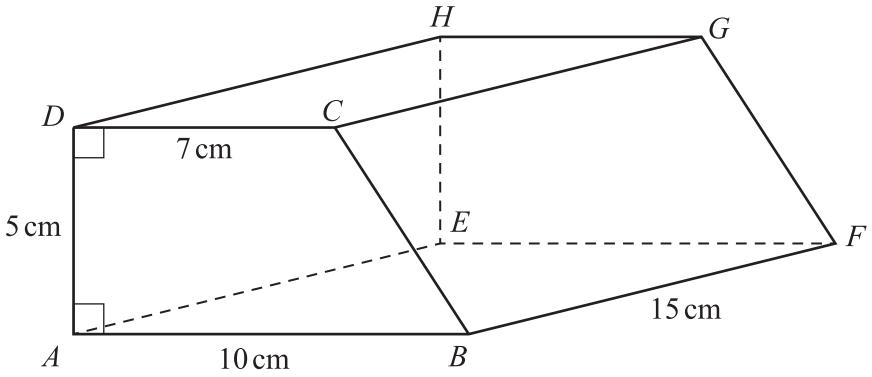
Calculate the angle between AV and the base $ABCD$.

..... [4]

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6



NOT TO SCALE

The diagram shows a prism of length 15 cm.
The cross-section of the prism is a trapezium.

Angle $DAB = 90°$ and angle $ADC = 90°$.
$AB = 10$ cm, $AD = 5$ cm and $DC = 7$ cm.

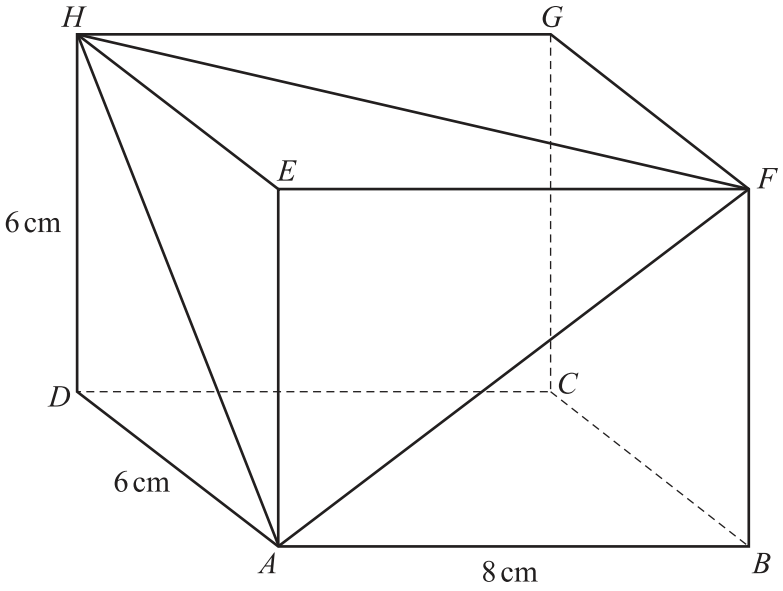
Calculate the angle the diagonal AG makes with the base $ABFE$.

..... [4]

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7



NOT TO SCALE

The diagram shows a cuboid.
$AB = 8\,\text{cm}$, $AD = 6\,\text{cm}$ and $DH = 6\,\text{cm}$.

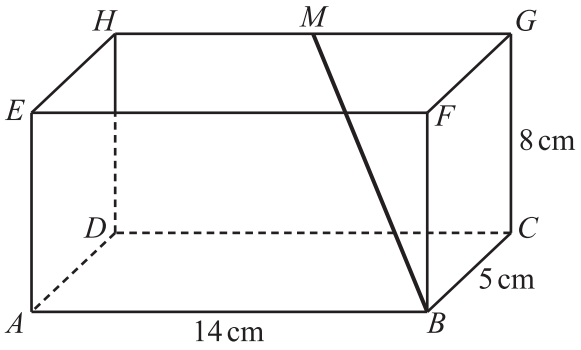
Calculate angle HAF.

Angle HAF = ... [6]

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8



NOT TO SCALE

The diagram shows a cuboid $ABCDEFGH$.
$AB = 14$ cm, $BC = 5$ cm and $CG = 8$ cm.
M is the midpoint of HG.

(a) Calculate BM.

..... cm [3]

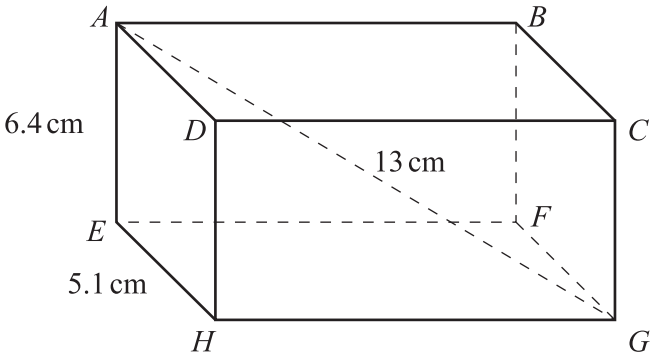
(b) Calculate the angle that BM makes with the base $ABCD$.

..... [3]

(a) 3D Pythagoras and trigonometry (b) 3D Pythagoras and trigonometry Click for more variations

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9



NOT TO SCALE

The diagram shows a cuboid $ABCDEFGH$.
$AE = 6.4$ cm, $EH = 5.1$ cm and $AG = 13$ cm.

(a) Calculate EF.

$EF =$ ..... cm [3]

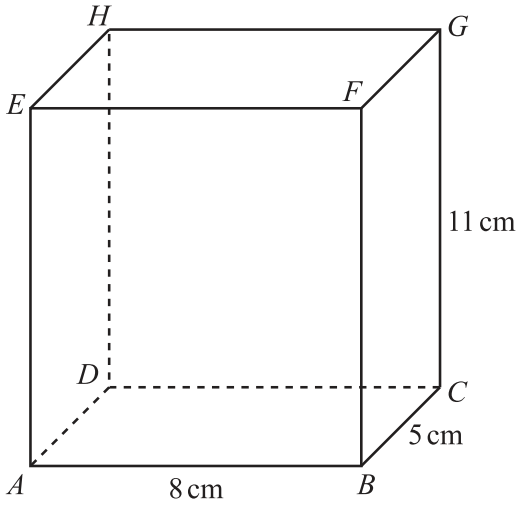
(b) Calculate the angle between the line AG and the base $EFGH$ of the cuboid.

..... [3]

(a) 3D Pythagoras and trigonometry (b) 3D Pythagoras and trigonometry Click for more variations

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10



NOT TO SCALE

ABCDEFGH is a cuboid.
$AB = 8$ cm, $BC = 5$ cm and $CG = 11$ cm.

(a) Work out the volume of the cuboid.

..... cm^3 [2]

(b) Ivana has a pencil of length 13 cm.

Does this pencil fit completely inside the cuboid?
Show how you decide.

[4]

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(c) **(i)** Calculate angle CAB.

Angle CAB = ... [2]

(ii) Calculate angle GAC.

Angle GAC = ... [2]

(a) Volume of cuboids (b) 3D Pythagoras and trigonometry (c)(i) SOHCAHTOA (c)(ii) 3D Pythagoras and trigonometry Click for more variations

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