3D Trig Worksheet

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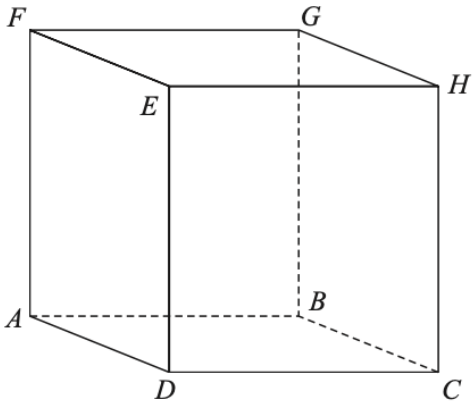
Questions in past papers often come up combined with other topics.
Topic tags have been given for each question to enable you to know if you can do the question or whether you need to wait to cover the additional topic(s).

Scan the QR code(s) or click the link for instant detailed model solutions!

18 *ABCDEFGH* is a cuboid.



$AB = 7.3$ cm
$CH = 8.1$ cm
Angle $BCA = 48°$

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

.....°

(Total for Question 18 is 4 marks)

20 Here is a cube *ABCDEFGH*.

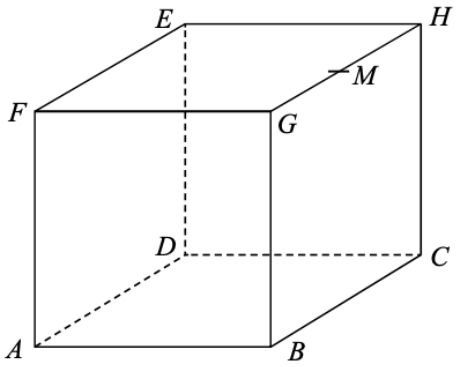


Diagram **NOT** accurately drawn

M is the midpoint of the edge *GH*.

Find the size of the angle between the line *MA* and the plane *ABCD*.
Give your answer correct to 1 decimal place.

.....°

(Total for Question 20 is 4 marks)

Qualification: IGCSE Edexcel A Higher
Areas: Trigonometry
Subtopics: 3D Trig, Pythagoras' Theorem, Surds
Paper: Paper-1HR / Series: 2022-June / Difficulty: Medium / Question Number: 18

18 The diagram shows a cube $ABCDEFGH$ with sides of length 6 cm.

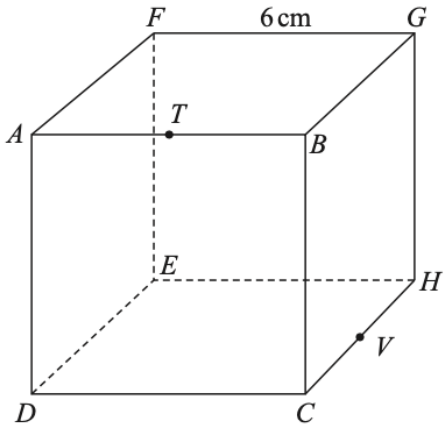


Diagram **NOT** accurately drawn

T is the midpoint of AB and V is the midpoint of CH

Work out the distance from T to V in a straight line through the cube.
Give your answer in the form $\sqrt{a}$ cm where a is an integer.

..... cm

(Total for Question 18 is 4 marks)

Qualification: IGCSE Edexcel A Higher
Areas: Trigonometry
Subtopics: 3D Trig, Pythagoras' Theorem, SOHCAHTOA
Paper: Paper-2HR / Series: 2022-January / Difficulty: Medium / Question Number: 19

19 $ABCD$ is a horizontal rectangular field.

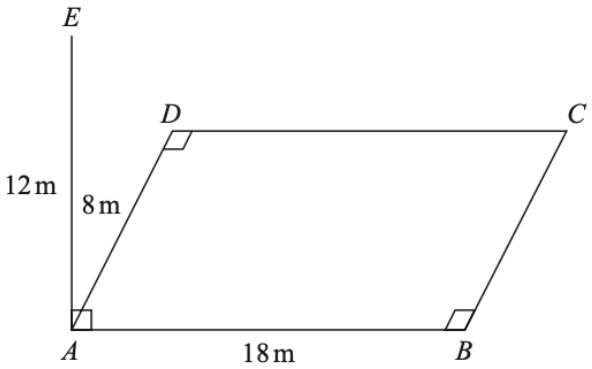


Diagram **NOT** accurately drawn

A vertical pole, AE, is placed at the corner A of the field.

$AE = 12\,\text{m}$ $AB = 18\,\text{m}$ $AD = 8\,\text{m}$

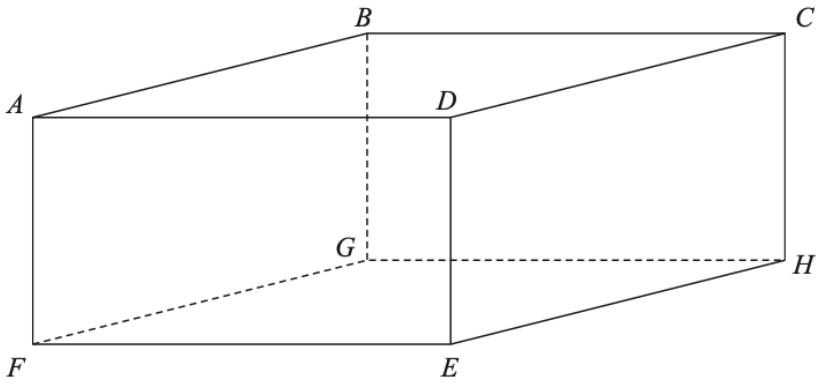
Calculate the size of the angle between EC and the plane $ABCD$
Give your answer correct to one decimal place.

.....°

(Total for Question 19 is 3 marks)

Qualification: GCSE Edexcel Higher
Areas: Trigonometry
Subtopics: 3D Trig, Pythagoras' Theorem, SOHCAHTOA
Paper: Paper-2H-Calculator / Series: 2022-November / Difficulty: Medium / Question Number: 20

20 *ABCDEFGH* is a cuboid.



$AD = 9\,\text{cm}$
$FD = 13\,\text{cm}$
Angle $GHF = 49°$

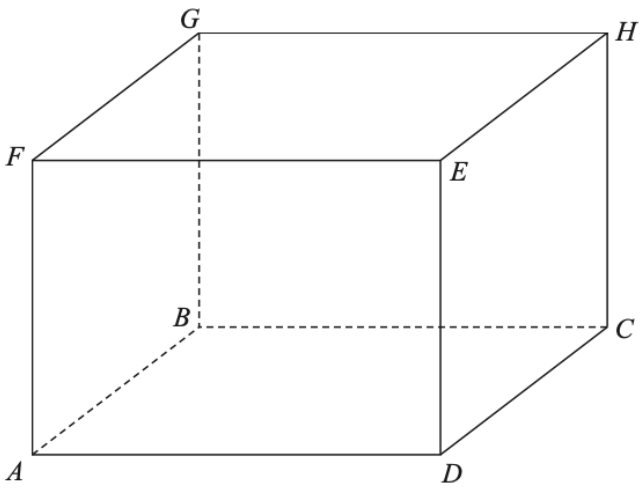
Work out the size of angle FAH.
Give your answer correct to the nearest degree.

.....°

(Total for Question 20 is 4 marks)

Qualification: GCSE Edexcel Higher
Areas: Trigonometry
Subtopics: 3D Trig, SOHCAHTOA
Paper: Paper-1H-Non-Calculator / Series: 2023-June / Difficulty: Medium / Question Number: 22

22 $ABCDEFGH$ is a cuboid.



$AF = 6.8\,\text{cm}$
$FC = 13.6\,\text{cm}$

Work out the size of the angle between FC and the plane $ABCD$.

.....°

(Total for Question 22 is 2 marks)

19 The diagram shows a cuboid $ABCDEFGH$.

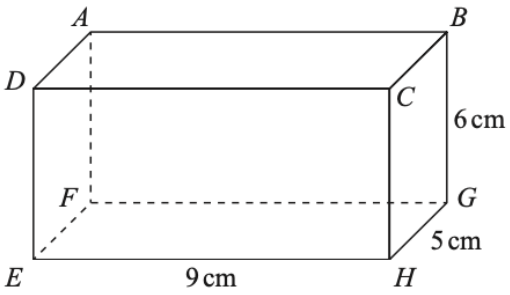


Diagram **NOT** accurately drawn

$EH = 9\,\text{cm}$, $HG = 5\,\text{cm}$ and $GB = 6\,\text{cm}$.

Work out the size of the angle between AH and the plane $EFGH$.
Give your answer correct to 3 significant figures.

.....°

(Total for Question 19 is 4 marks)

Qualification: IGCSE Edexcel A Higher
Areas: Trigonometry
Subtopics: 3D Trig, Pythagoras' Theorem, SOHCAHTOA
Paper: Paper-1H / Series: 2021-June / Difficulty: Medium / Question Number: 22

22 The diagram shows a triangular prism $ABCDEF$ with a horizontal base $ABEF$.

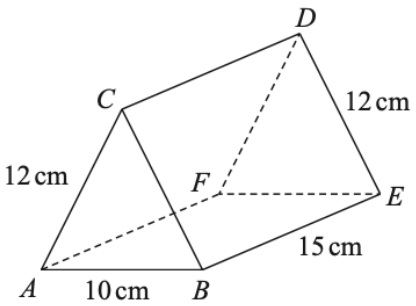


Diagram **NOT** accurately drawn

$AC = BC = FD = ED = 12\,\text{cm}$ $AB = 10\,\text{cm}$ $BE = 15\,\text{cm}$

Calculate the size of the angle between AD and the base $ABEF$.
Give your answer correct to 3 significant figures.

.....°

(Total for Question 22 is 4 marks)

21 The diagram shows a triangular prism, *ABCDEF*, with a rectangular base *ABCD*

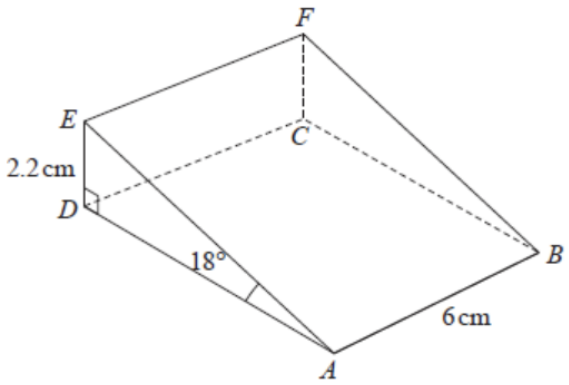


Diagram **NOT** accurately drawn

AB = 6 cm *DE* = 2.2 cm angle *DAE* = 18° angle *ADE* = 90°

Work out the angle that *BE* makes with the plane *ABCD*
Give your answer correct to one decimal place.

.....°

(Total for Question 21 is 4 marks)

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19 The diagram shows a triangular prism.

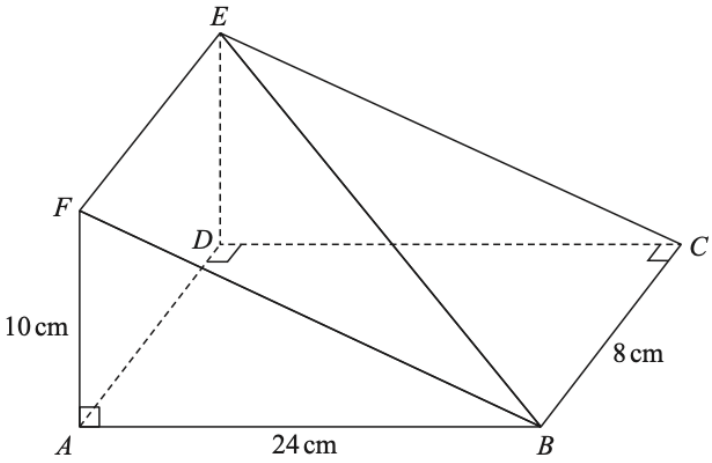


Diagram **NOT** accurately drawn

$AF = 10\,\text{cm}$, $AB = 24\,\text{cm}$ and $BC = 8\,\text{cm}$.
Angle FAB = angle ADC = angle $BCD = 90°$

Work out the size of the angle between the line BE and the plane $ABCD$.
Give your answer correct to 1 decimal place.

.....°

(Total for Question 19 is 3 marks)

Qualification: IGCSE Edexcel A Higher
Areas: Trigonometry
Subtopics: 3D Trig, Ratio, Pythagoras' Theorem, SOHCAHTOA
Paper: Paper-2H / Series: 2019-June / Difficulty: Somewhat Challenging / Question Number: 21

21 The diagram shows cuboid $ABCDEFGH$.

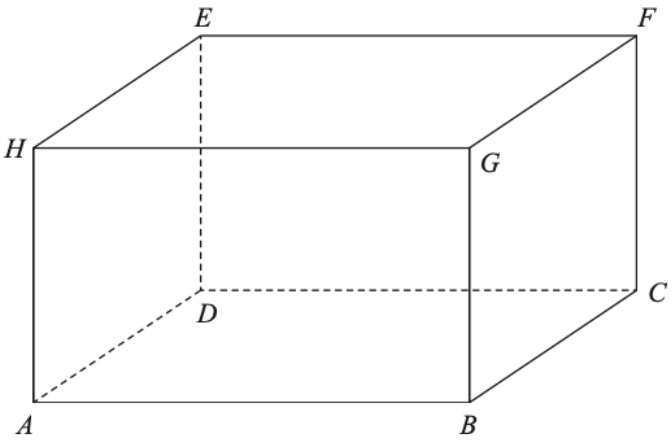


Diagram **NOT** accurately drawn

For this cuboid

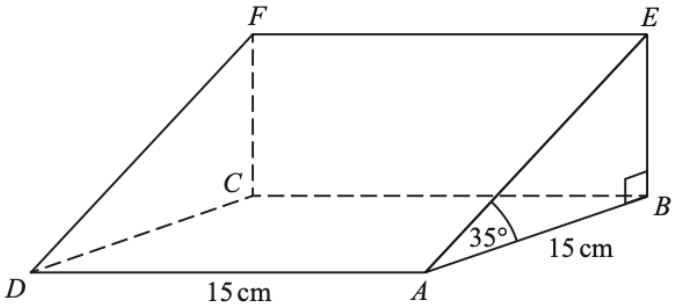
the length of AB : the length of BC : the length of $CF = 4 : 2 : 3$

Calculate the size of the angle between AF and the plane $ABCD$.
Give your answer correct to one decimal place.

.....°

(Total for Question 21 is 3 marks)

19 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 $EAB = 35°$

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 19 is 4 marks)

17 The diagram shows a prism *ABCDEFGH* with a horizontal base.

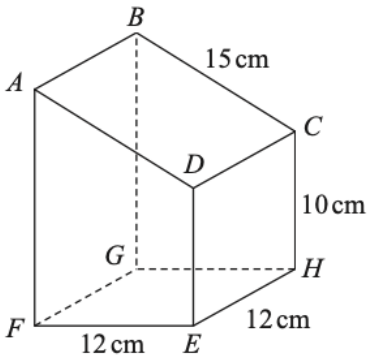


Diagram **NOT** accurately drawn

The base of the prism, *EFGH*, is a square of side 12 cm.
Trapezium *ADEF* is a cross section of the prism where *AF* and *DE* are vertical edges.

$DE = CH = 10$ cm
$AD = BC = 15$ cm

(a) Work out the size of the angle between *CF* and the base *EFGH*.
Give your answer correct to one decimal place.

..... °
(3)

(b) Work out the length of *BE*.
Give your answer correct to one decimal place.

..... cm
(3)

(Total for Question 17 is 6 marks)

18 The diagram shows cuboid *ABCDEFGH*.

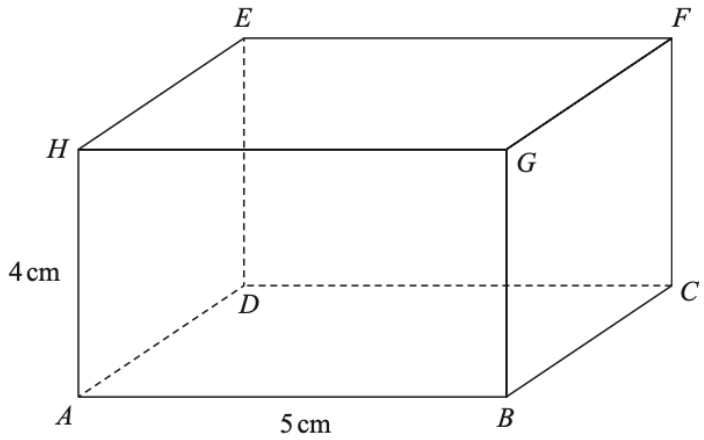


Diagram **NOT** accurately drawn

$AB = 5$ cm
$AH = 4$ cm
The size of the angle between CH and the plane $ABCD$ is 35°

Calculate the volume of the cuboid.
Give your answer correct to 3 significant figures.

.....cm^3

(Total for Question 18 is 5 marks)

Qualification: IGCSE Edexcel A Higher
Areas: Trigonometry
Subtopics: 3D Trig, Pythagoras' Theorem, Midpoints, SOHCAHTOA
Paper: Paper-2HR / Series: 2023-June / Difficulty: Somewhat Challenging / Question Number: 22

22 Here is a cuboid $ABCDEFGH$

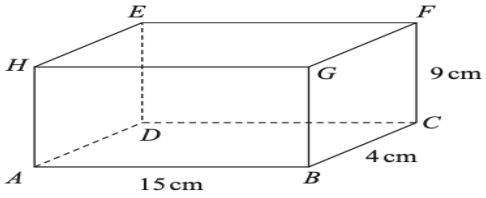


Diagram **NOT** accurately drawn

$AB = 15\,\text{cm}$ $BC = 4\,\text{cm}$ $CF = 9\,\text{cm}$

(a) Work out the length of BE
Give your answer correct to 3 significant figures.

..... cm
(2)

Here is a cuboid $PQRSTUVW$

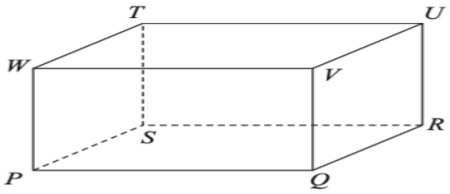


Diagram **NOT** accurately drawn

$PR = 42\,\text{cm}$

The size of the angle between PU and the plane $PQRS$ is 30°

M is the midpoint of PR

(b) Work out the size of angle UMR
Give your answer correct to 3 significant figures.

.....
(3)

(Total for Question 22 is 5 marks)

Qualification: IGCSE Edexcel A Higher

Areas: Trigonometry, Shapes

Subtopics: 3D Trig, 3D Shapes - Surface Area, SOHCAHTOA, 3D Shapes - Surface Area Of A Prism

Paper: Paper-2H / Series: 2021-January / Difficulty: Somewhat Challenging / Question Number: 17

17 The diagram shows a solid prism $ABCDEFGH$.

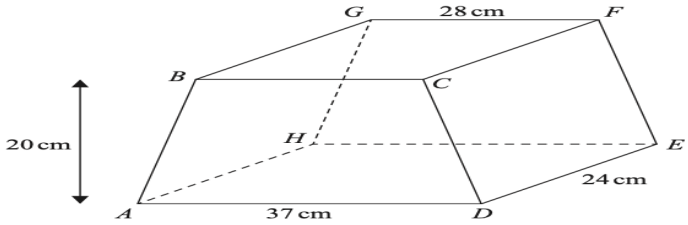


Diagram **NOT** accurately drawn

The trapezium $ABCD$, in which AD is parallel to BC, is a cross section of the prism.
The base $ADEH$ of the prism is a horizontal plane.
$ADEH$ and $BCFG$ are rectangles.
The midpoint of BC is vertically above the midpoint of AD so that $BA = CD$.

$AD = 37\,\text{cm}$ $GF = 28\,\text{cm}$ $DE = 24\,\text{cm}$

The perpendicular distance between edges AD and BC is 20 cm.

(a) Work out the total surface area of the prism.

..... cm²

(4)

(b) Calculate the size of the angle between AF and the plane $ADEH$.
Give your answer correct to one decimal place.

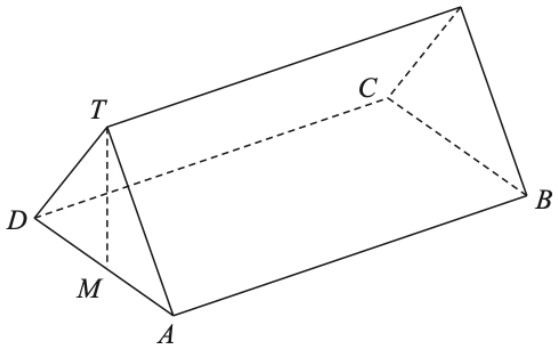
.....

(3)

(Total for Question 17 is 7 marks)

Qualification: GCSE Edexcel Higher
Areas: Trigonometry
Subtopics: 3D Trig, Ratio With Shapes, Ratio, Pythagoras' Theorem, SOHCAHTOA, Ratio - Share
Paper: Paper-3H-Calculator / Series: 2023-November / Difficulty: Somewhat Challenging / Question Number: 24

24 The diagram shows a triangular prism with a horizontal rectangular base $ABCD$.



M is the midpoint of AD.
The vertex T of the prism is vertically above M.

$AB = 14.7\,\text{cm}$ $BC = 3.8\,\text{cm}$ $MT = 2.3\,\text{cm}$

P is the point on AB such that

$$AP : PB = 5 : 2$$

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

.....°

(Total for Question 24 is 4 marks)

Qualification: IGCSE Edexcel A Higher
Areas: Trigonometry
Subtopics: SOHCAHTOA, 3D Trig
Paper: Paper-2HR / Series: 2021-January / Difficulty: Somewhat Challenging / Question Number: 22

22 ABC is an isosceles triangle in a horizontal plane.
The point T is vertically above B.

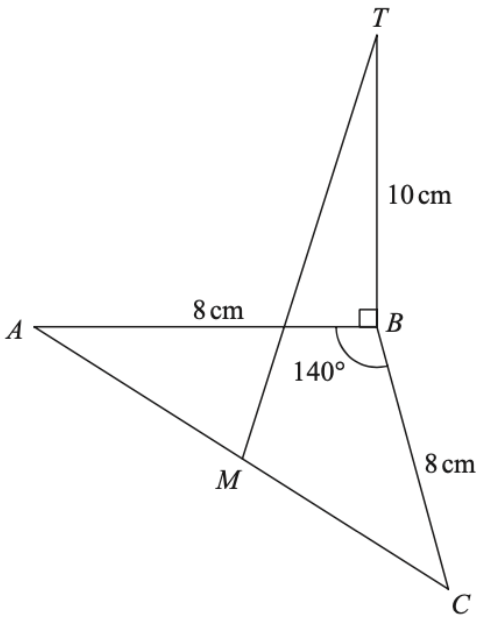


Diagram **NOT** accurately drawn

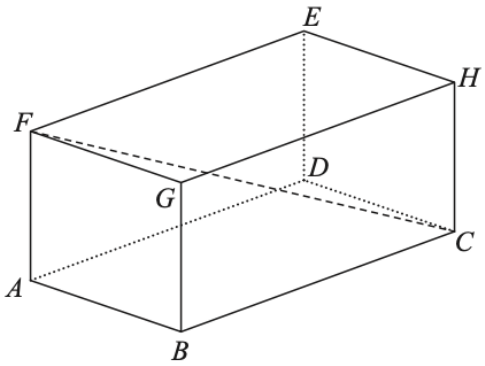
Angle $ABC = 140°$
$AB = BC = 8$ cm
$TB = 10$ cm
M is the midpoint of AC.

Calculate the size of the angle between MT and the horizontal plane ABC.
Give your answer correct to one decimal place.

.....°

(Total for Question 22 is 4 marks)

12 The diagram shows a cuboid $ABCDEFGH$.



$AB = 7$ cm, $AF = 5$ cm and $FC = 15$ cm.

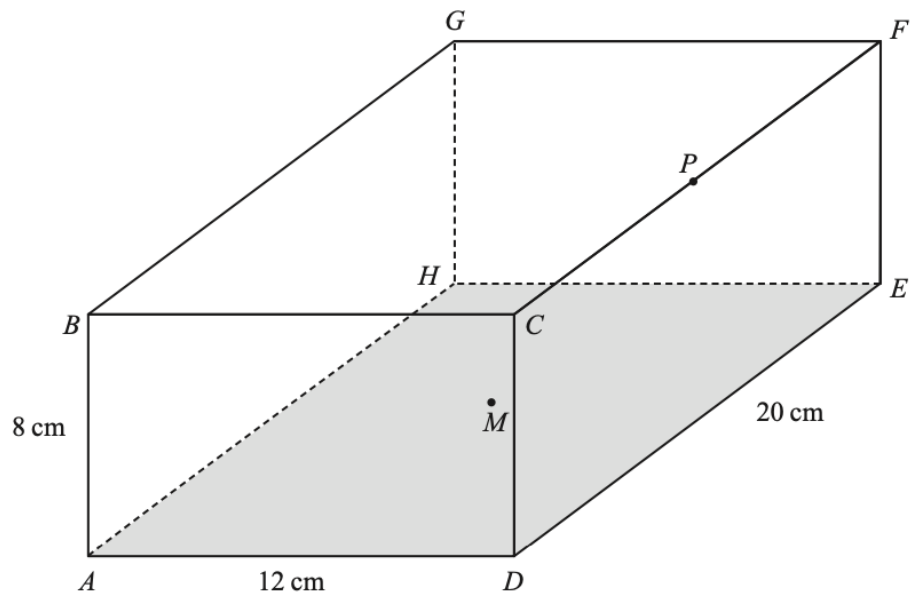
Calculate the volume of the cuboid.
Give your answer correct to 3 significant figures.

..... cm^3

(Total for Question 12 is 4 marks)

22 The diagram shows a cuboid $ABCDEFGH$ with horizontal base $ADEH$

Diagram **NOT** accurately drawn



$AB = 8$ cm $\quad AD = 12$ cm $\quad DE = 20$ cm

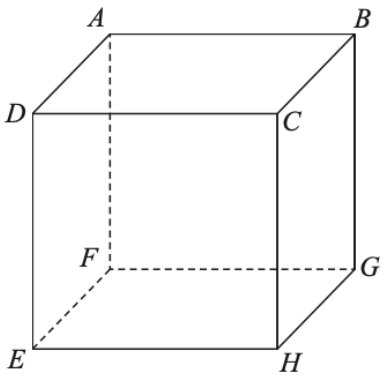
M is the midpoint of the base $ADEH$ and P is the midpoint of the edge CF

Work out the size of angle BMP
Give your answer correct to one decimal place.

.....°

(Total for Question 22 is 6 marks)

18 The diagram shows a cube.



$AH = 11.3$ cm correct to the nearest mm.

Calculate the lower bound for the length of an edge of the cube.
You must show all your working.

..... cm

(Total for Question 18 is 4 marks)

23 The diagram shows a solid prism $ABCDEFGHIJ$

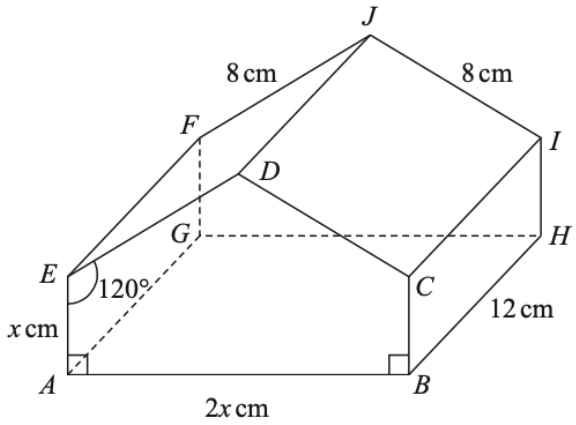


Diagram **NOT** accurately drawn

The prism is such that each cross section is a pentagon where

$AE = BC = x$ cm $\quad AB = 2x$ cm $\quad ED = CD = 8$ cm

angle EAB = angle $CBA = 90°$ $\quad$ angle AED = angle $BCD = 120°$

Given that $AG = BH = EF = DJ = CI = 12$ cm

calculate the angle that AJ makes with the base $ABHG$ of the prism.
Give your answer correct to 3 significant figures.

.....°

(Total for Question 23 is 5 marks)