18 The diagram shows cuboid *ABCDEFGH*.

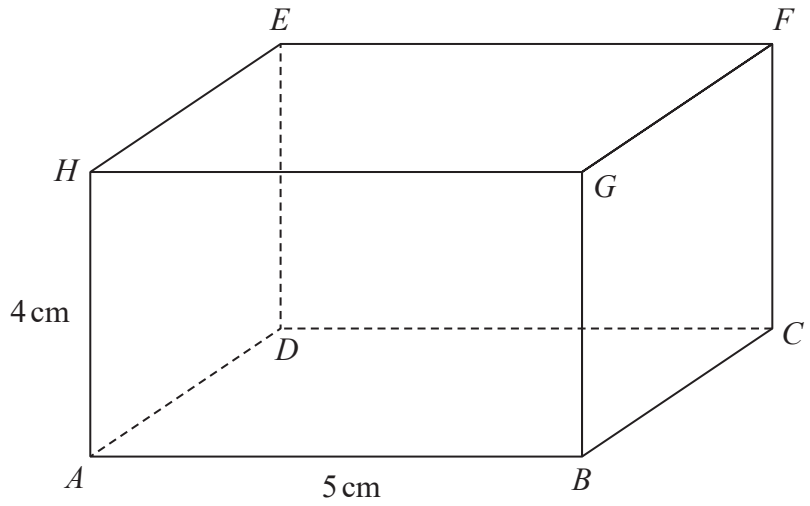


Diagram **NOT** accurately drawn

$AB = 5$ 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)

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

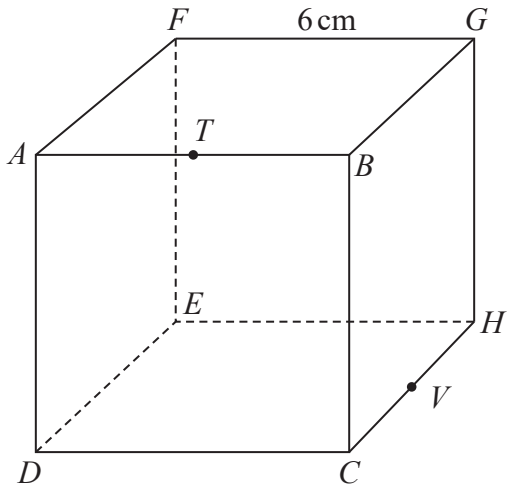


Diagram **NOT** accurately drawn

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)

19 The diagram shows a cuboid *ABCDEFGH*.

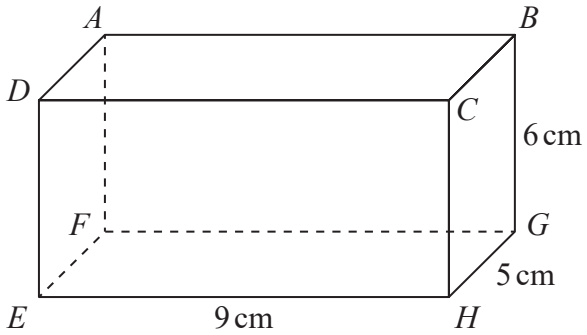


Diagram **NOT** accurately drawn

$EH = 9\,\text{cm}$, $HG = 5\,\text{cm}$ 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)

20 Here is a cube *ABCDEFGH*.

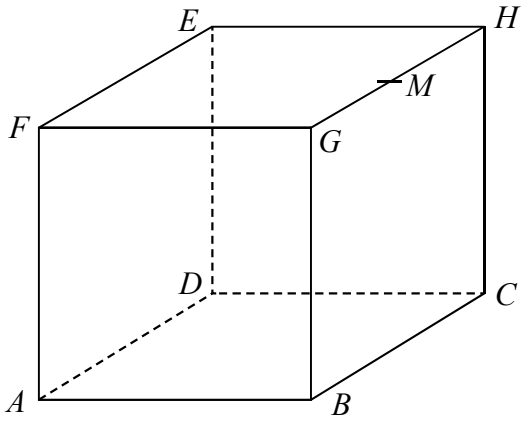


Diagram **NOT** accurately drawn

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)

21 The diagram shows cuboid *ABCDEFGH*.

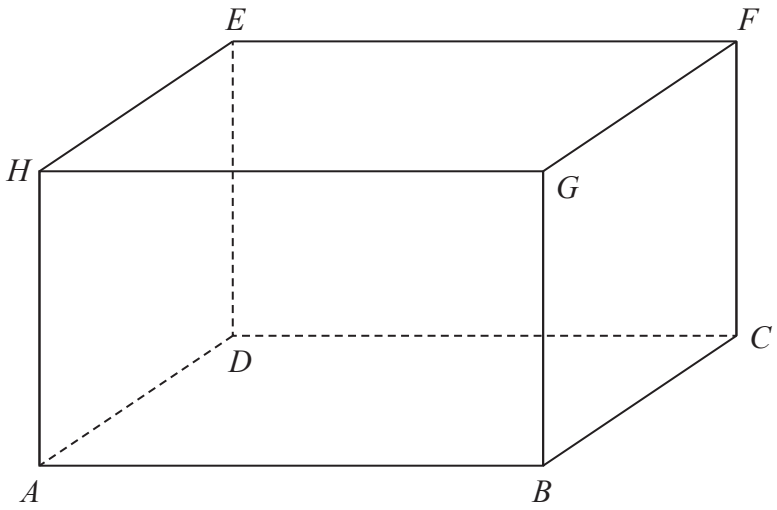


Diagram **NOT** accurately drawn

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)

22 Here is a cuboid *ABCDEFGH*

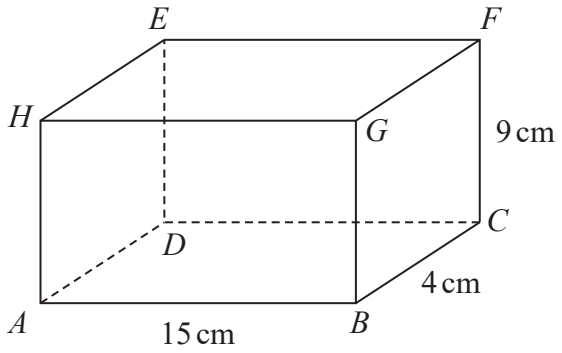


Diagram **NOT** accurately drawn

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

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

..... cm

(2)

Here is a cuboid *PQRSTUVW*

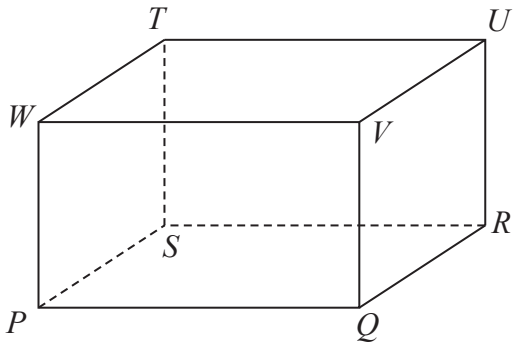


Diagram **NOT** accurately drawn

PR = 42 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.

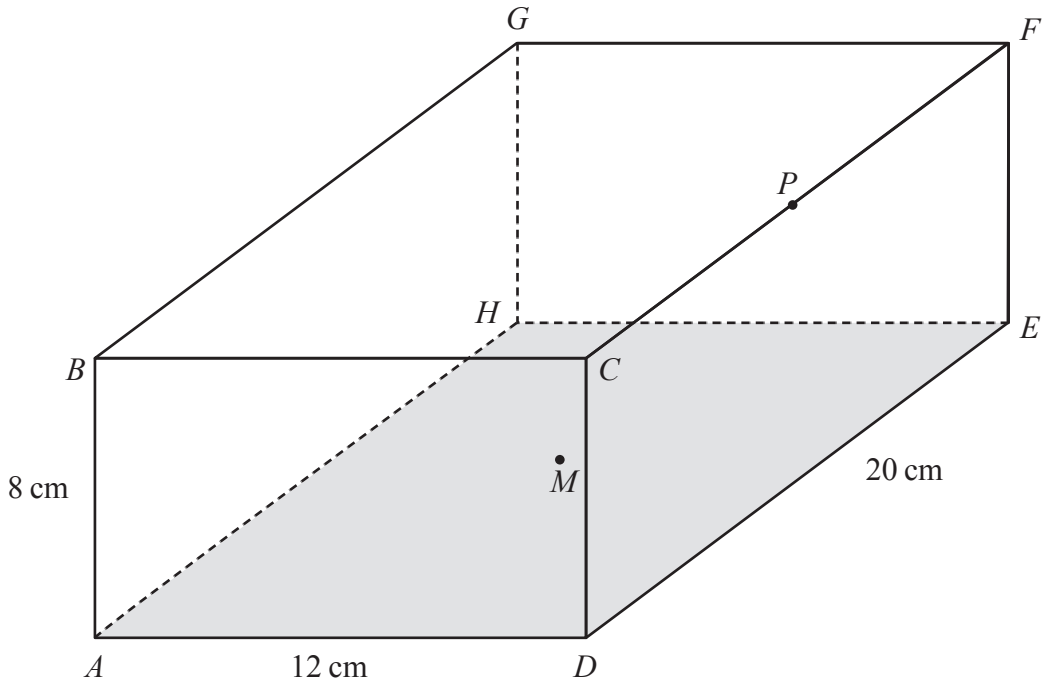
.....°

(3)

(Total for Question 22 is 5 marks)

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

Diagram **NOT** accurately drawn



AB = 8 cm *AD* = 12 cm *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)

10 Here is a triangular prism.

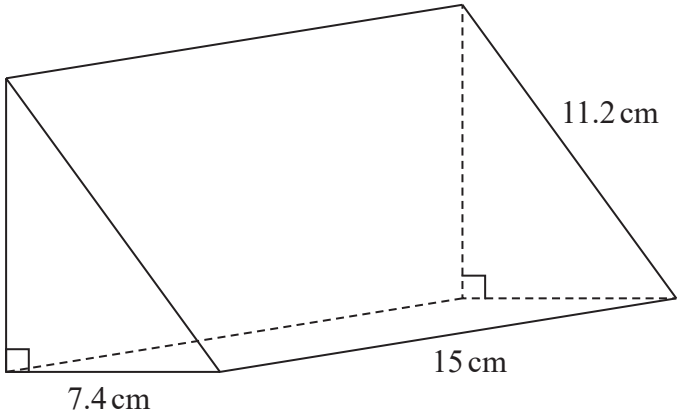


Diagram **NOT** accurately drawn

Work out the volume of the prism.
Give your answer correct to 3 significant figures.

..... cm^3

(Total for Question 10 is 5 marks)

19 The diagram shows a triangular prism.

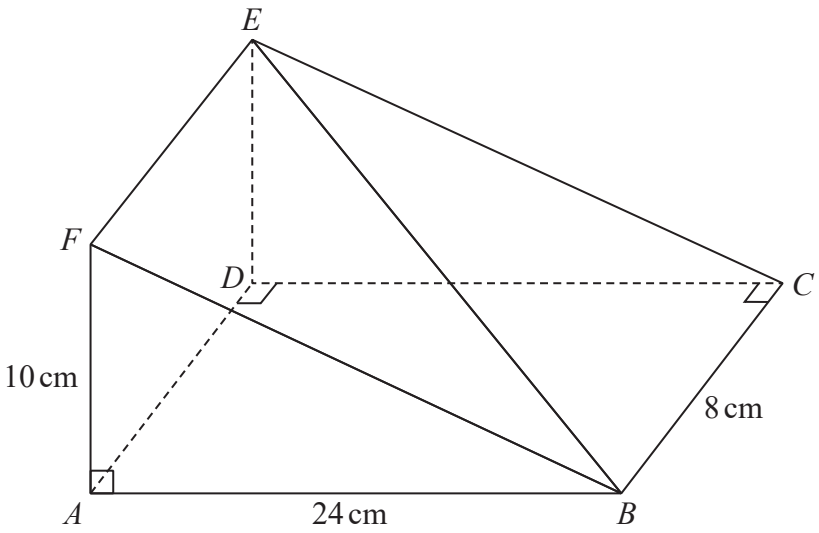


Diagram **NOT** accurately drawn

$AF = 10$ cm, $AB = 24$ cm and $BC = 8$ 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)

21 Here is a triangular prism *ABCDEF*

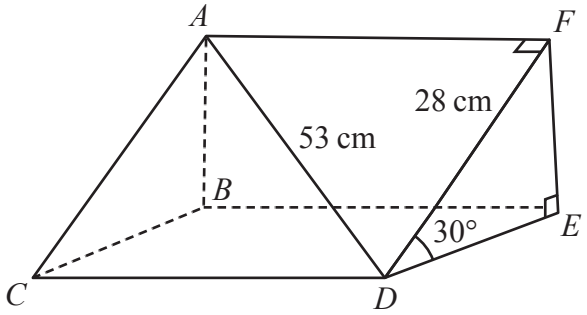


Diagram **NOT** accurately drawn

AD = 53 cm
DF = 28 cm
Angle *FDE* = 30°

Work out the volume of the triangular prism.
Give your answer correct to the nearest whole number.

..... cm^3

(Total for Question 21 is 5 marks)

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

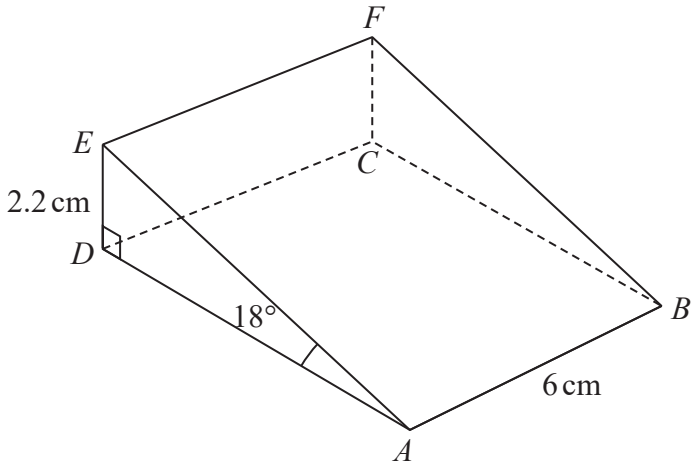


Diagram **NOT** accurately drawn

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)

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

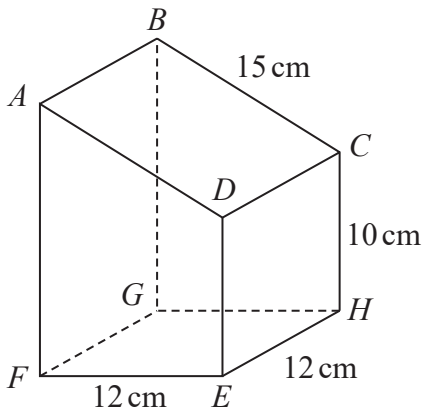


Diagram **NOT** accurately drawn

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)

17 The diagram shows a solid prism *ABCDEFGH*.

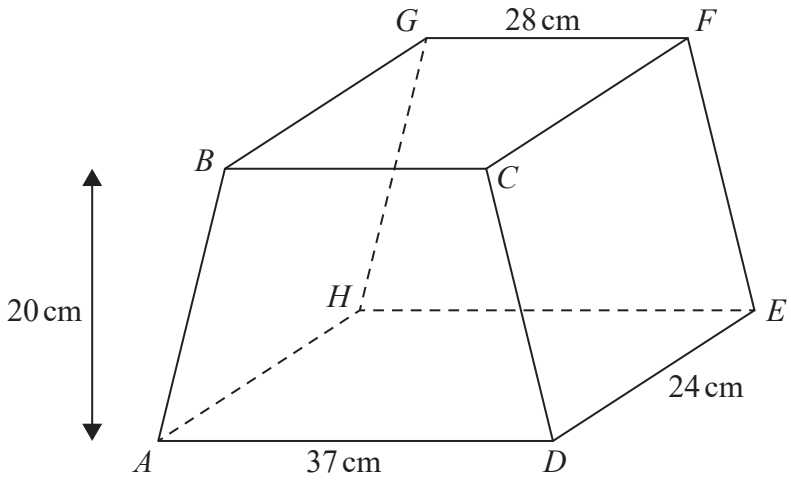


Diagram **NOT** accurately drawn

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 cm *GF* = 28 cm *DE* = 24 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)

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

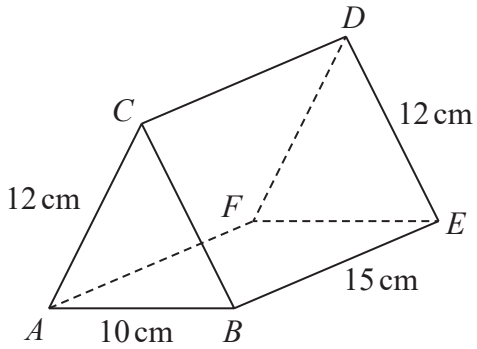


Diagram **NOT** accurately drawn

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

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 the prism *ABCDEFGHJK* with horizontal base *AEFG*

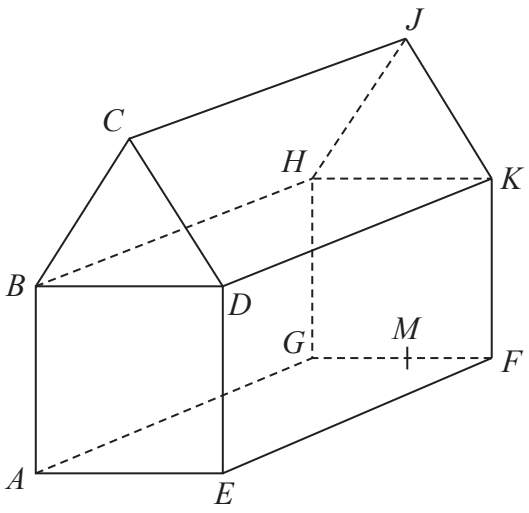


Diagram **NOT** accurately drawn

ABCDE is a cross section of the prism where
ABDE is a square
BCD is an equilateral triangle

$EF = 2 \times AE$
M is the midpoint of *GF* so that *JM* is vertical.

Angle $MAJ = y°$

Given that $\tan y° = T$

find the value of *T*, giving your answer in the form $\frac{\sqrt{p} + \sqrt{q}}{17}$ where *p* and *q* are integers.

$T =$ .....

(Total for Question 21 is 5 marks)

23 The diagram shows a solid prism *ABCDEFGHIJ*

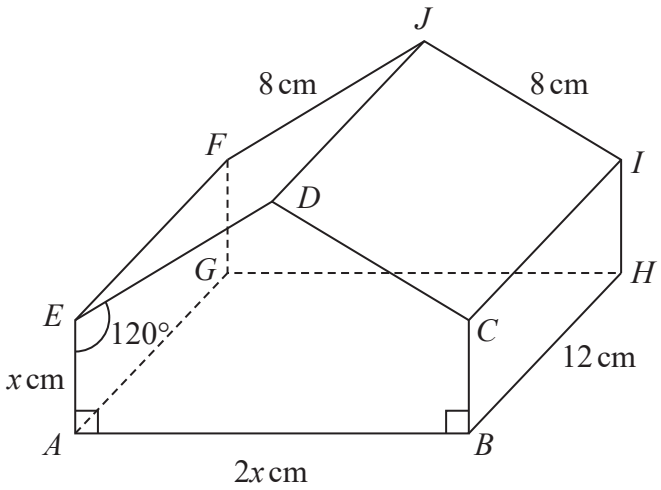


Diagram **NOT** accurately drawn

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

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

angle EAB = angle $CBA = 90°$ 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)

21 The diagram shows the prism *ABCDEF* with cross section triangle *ABC*.

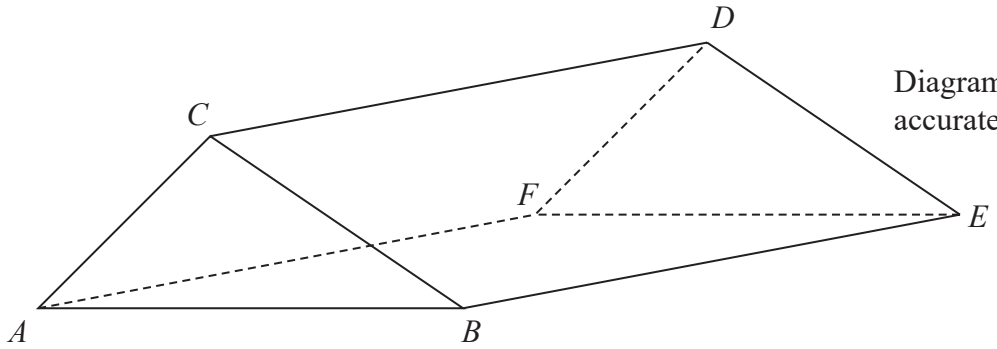


Diagram **NOT** accurately drawn

Angle *BEC* = 40° and angle *ACB* is obtuse.
AC = 6 cm and *CE* = 13 cm

The area of triangle *ABC* is 22 cm^2

Calculate the length of *AB*.
Give your answer correct to one decimal place.

..... cm

(Total for Question 21 is 6 marks)

23 The diagram shows a solid pyramid *ABCDE* with a horizontal base.

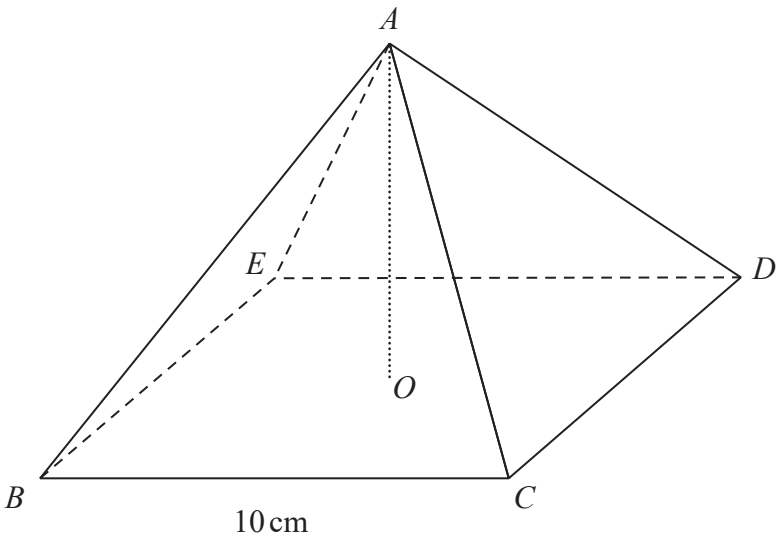


Diagram **NOT** accurately drawn

The base, *BCDE*, of the pyramid is a square of side 10 cm.

The vertex *A* of the pyramid is vertically above the centre *O* of the base so that $AB = AC = AD = AE$

The **total** surface area of the pyramid is 360 cm^2

Work out the size of the angle between *AC* and the base *BCDE*.
Give your answer correct to 3 significant figures.

.....°

(Total for Question 23 is 6 marks)