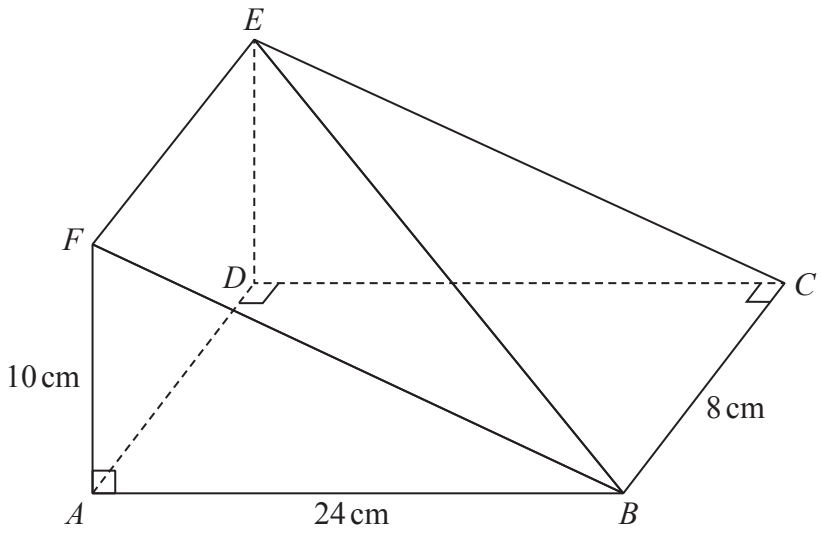
1 The diagram shows a triangular prism.



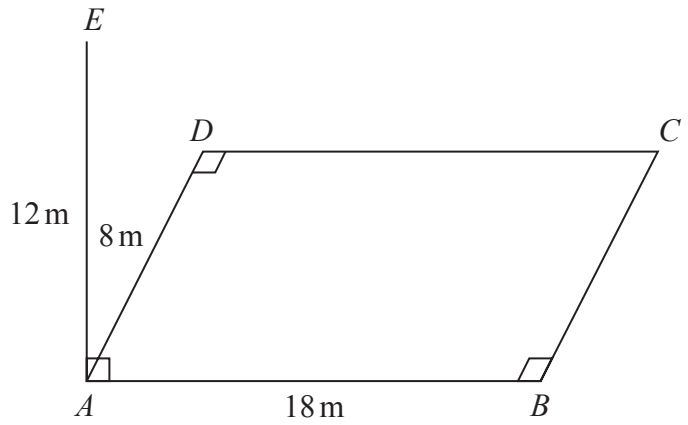
$AF = 10$ cm, $AB = 24$ cm and $BC = 8$ cm.
Angle FAB = angle ADC = angle $BCD = 90°$

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 1 is 3 marks)

2 *ABCD* is a horizontal rectangular field.



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

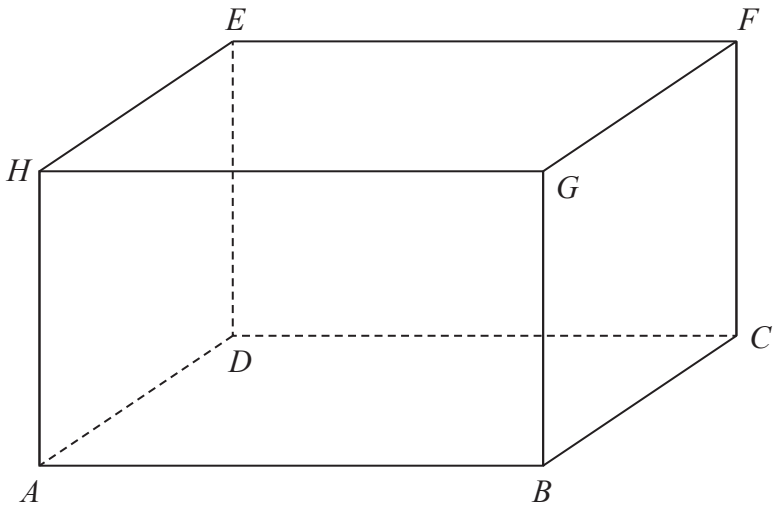
$AE = 12\,\text{m}$ $AB = 18\,\text{m}$ $AD = 8\,\text{m}$

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

.....°

(Total for Question 2 is 3 marks)

3 The diagram shows cuboid *ABCDEFGH*.



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 3 is 3 marks)

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

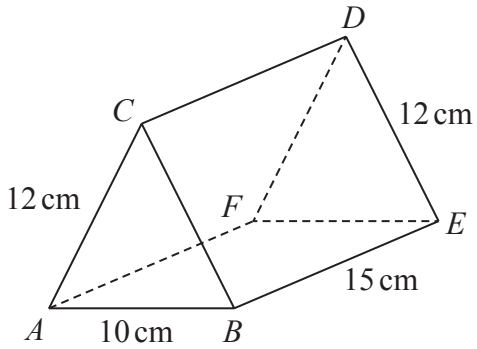


Diagram **NOT** accurately drawn

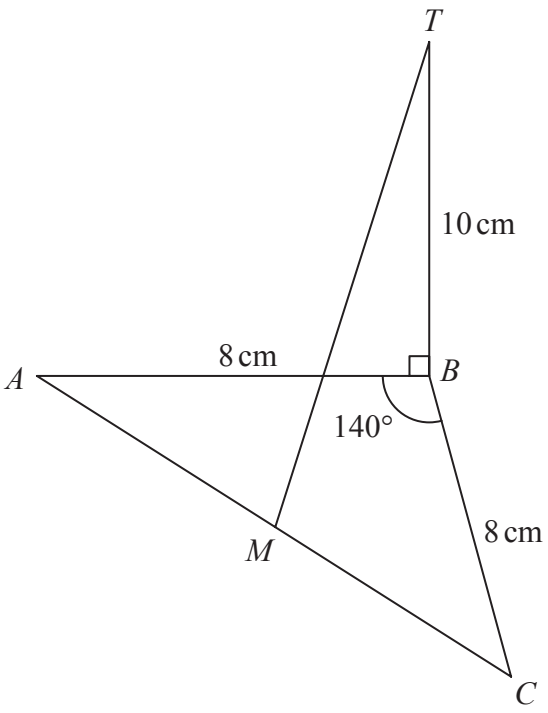
$AC = BC = FD = ED = 12\,\text{cm}$ $AB = 10\,\text{cm}$ $BE = 15\,\text{cm}$

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

.....°

(Total for Question 4 is 4 marks)

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



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

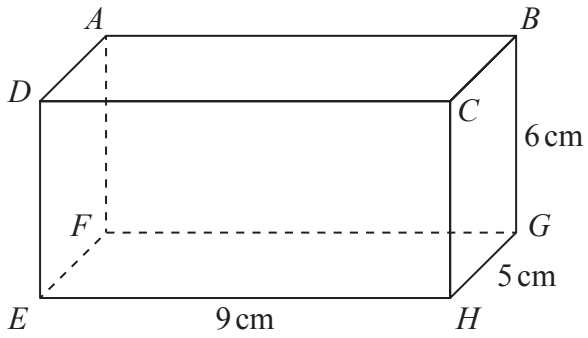
Calculate the size of the angle between MT and the horizontal plane ABC.
Give your answer correct to one decimal place.

°

.....

(Total for Question 5 is 4 marks)

6 The diagram shows a cuboid *ABCDEFGH*.



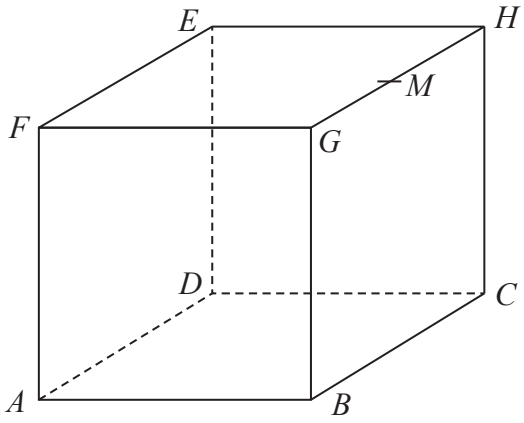
EH = 9 cm, *HG* = 5 cm and *GB* = 6 cm.

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

.....°

(Total for Question 6 is 4 marks)

7 Here is a cube *ABCDEFGH*.



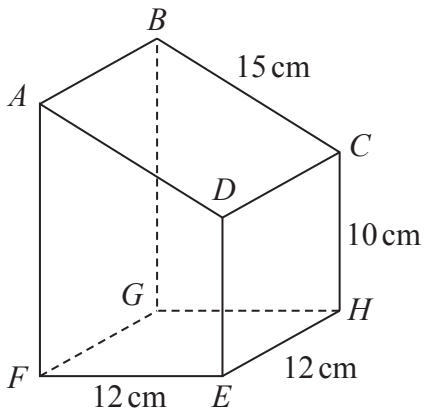
M is the midpoint of the edge *GH*.

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 7 is 4 marks)

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



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)

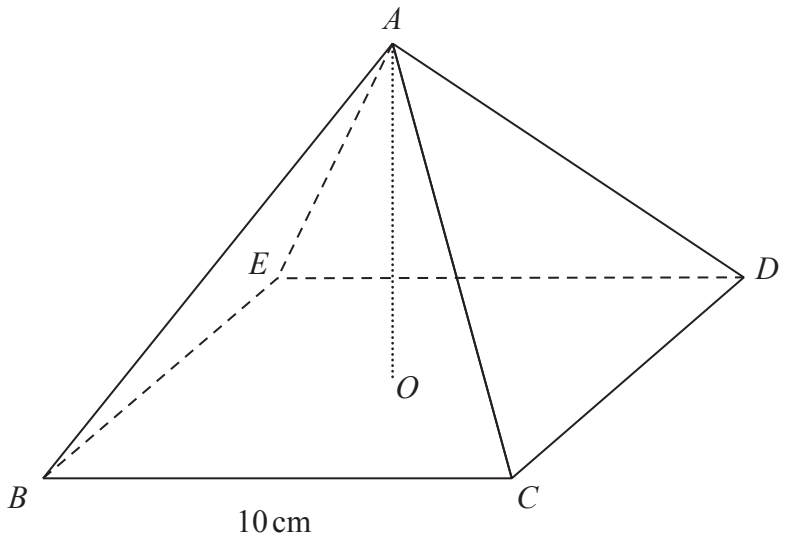
(b) Work out the length of *BE*.
Give your answer correct to one decimal place.

..... cm

(3)

(Total for Question 8 is 6 marks)

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



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

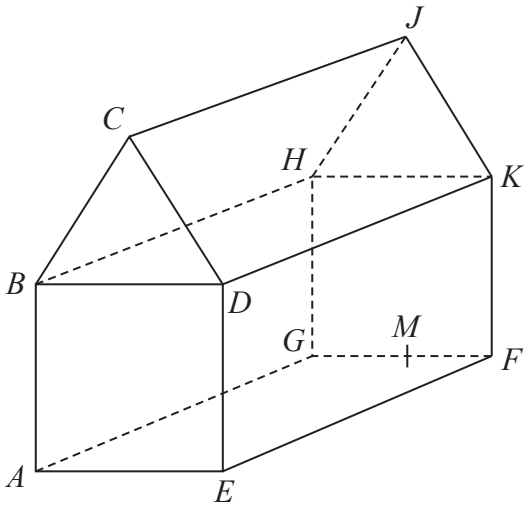
Work out the size of the angle between *AC* and the base *BCDE*.
Give your answer correct to 3 significant figures.

°

.....

(Total for Question 9 is 6 marks)

10 The diagram shows the prism *ABCDEFGHJK* with horizontal base *AEFG*



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 $MAJ = y°$

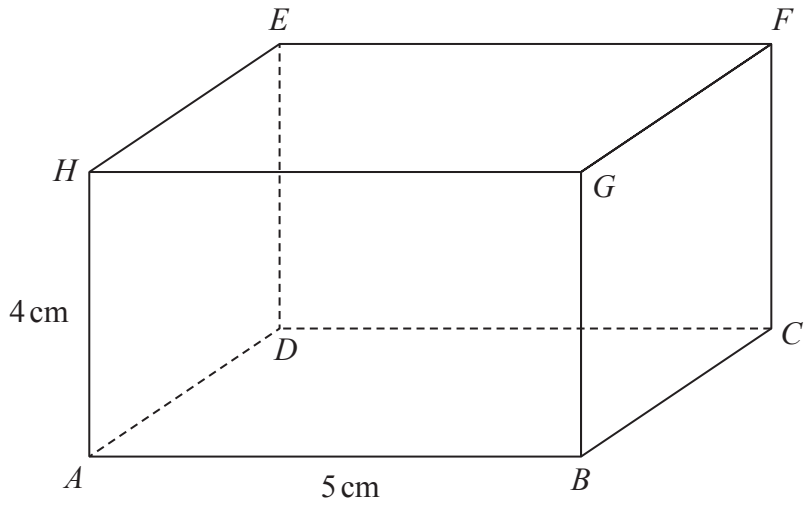
Given that $\tan y° = T$

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

$T =$ .....

(Total for Question 10 is 5 marks)

11 The diagram shows cuboid *ABCDEFGH*.



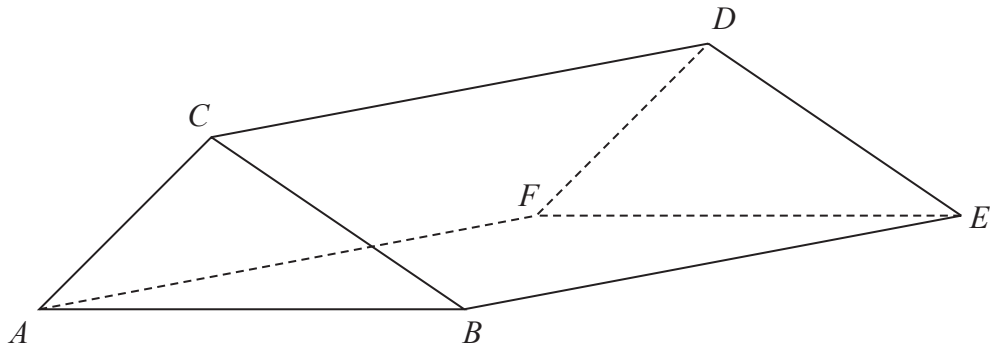
$AB = 5\,\text{cm}$
$AH = 4\,\text{cm}$
The size of the angle between CH and the plane $ABCD$ is 35°

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

..... cm^3

(Total for Question 11 is 5 marks)

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



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

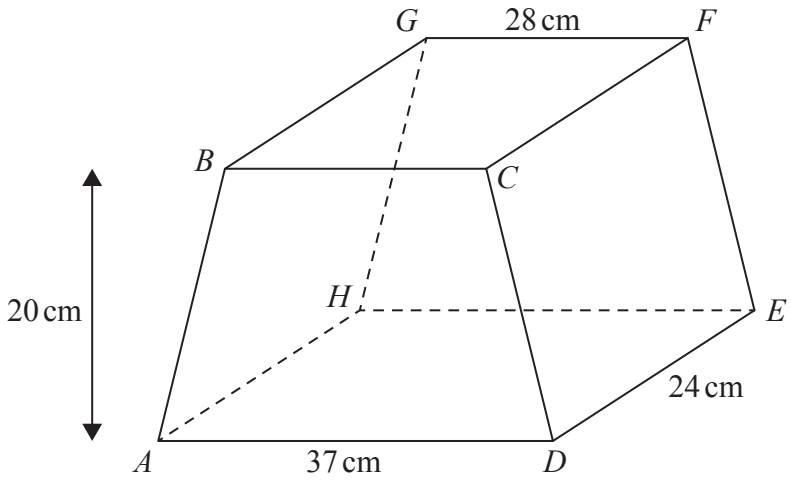
The area of triangle *ABC* is 22 cm^2

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

..... cm

(Total for Question 12 is 6 marks)

13 The diagram shows a solid prism *ABCDEFGH*.



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 13 is 7 marks)

14 The diagram shows a cone.

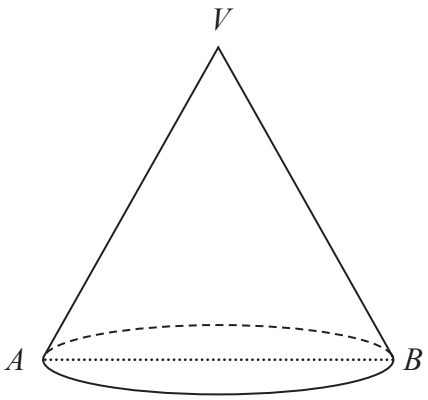


Diagram **NOT** accurately drawn

AB is a diameter of the cone.
V is the vertex of the cone.

Given that

the area of the base of the cone : the total surface area of the cone = 3 : 8

work out the size of angle *AVB*.
Give your answer correct to 1 decimal place.

°

(Total for Question 14 is 6 marks)