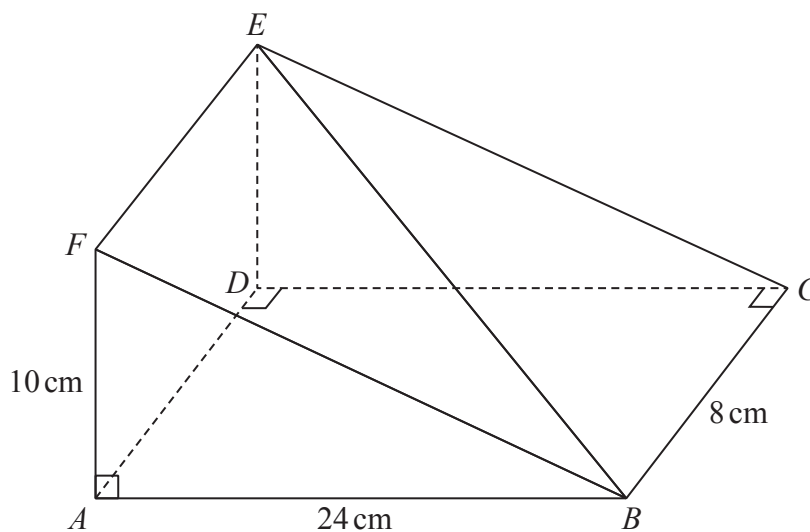


1 The diagram shows a triangular prism.



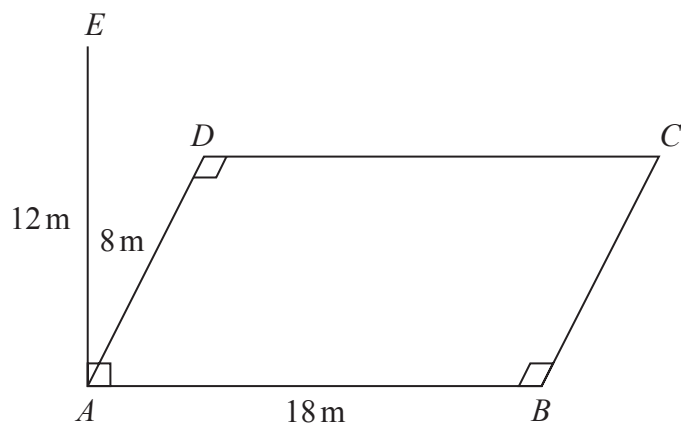
$AF = 10\text{ cm}$, $AB = 24\text{ cm}$ and $BC = 8\text{ cm}$.
 Angle $FAB = \text{angle } ADC = \text{angle } BCD = 90^\circ$

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

o

(Total for Question 1 is 3 marks)

2 $ABCD$ is a horizontal rectangular field.



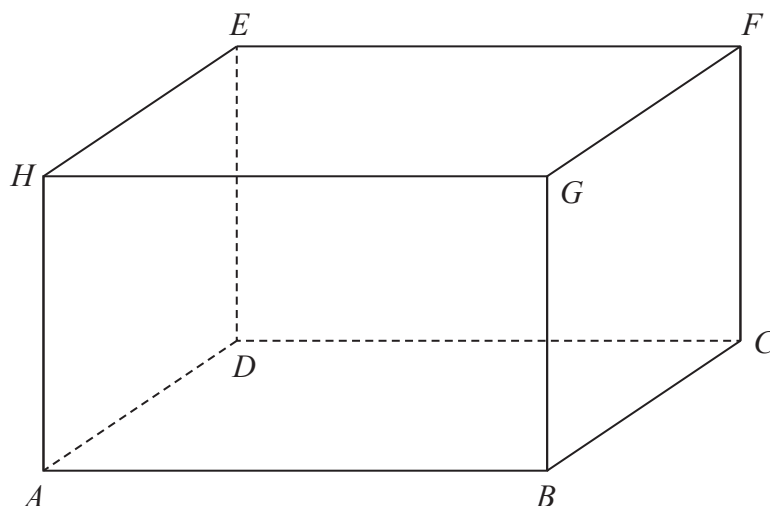
A vertical pole, AE , is placed at the corner A of the field.

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

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 $ABEF$.

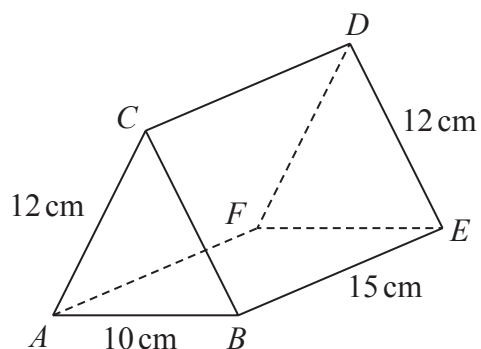
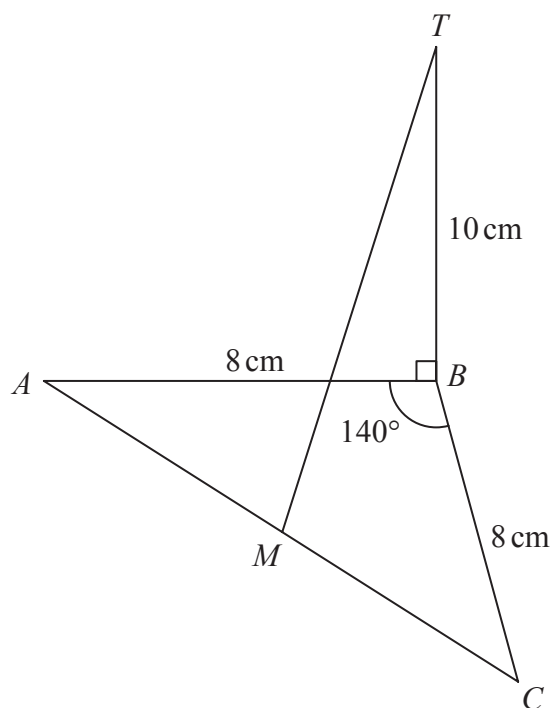


Diagram **NOT**
accurately drawn

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

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

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



Angle $ABC = 140^\circ$

$AB = BC = 8\text{ cm}$

$TB = 10\text{ cm}$

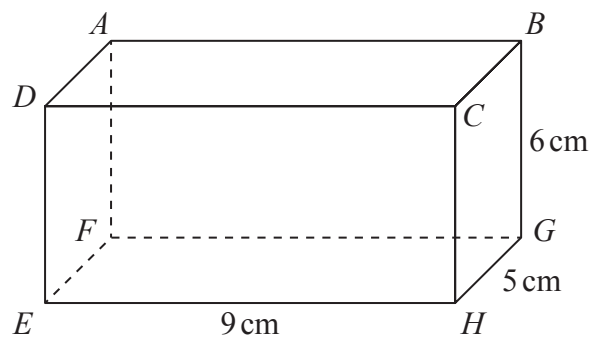
M is the midpoint of AC .

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

o

(Total for Question 5 is 4 marks)

6 The diagram shows a cuboid $ABCDEFGH$.



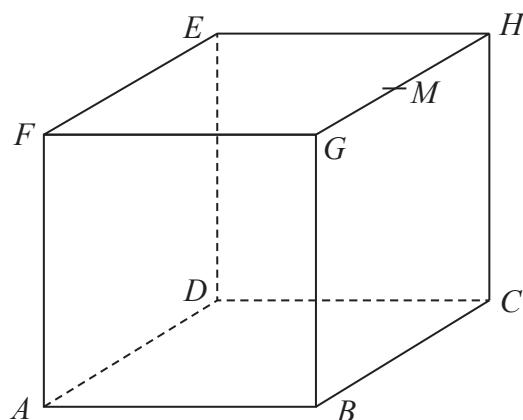
$EH = 9\text{ cm}$, $HG = 5\text{ cm}$ and $GB = 6\text{ cm}$.

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

o

(Total for Question 6 is 4 marks)

7 Here is a cube $ABCDEFGH$.

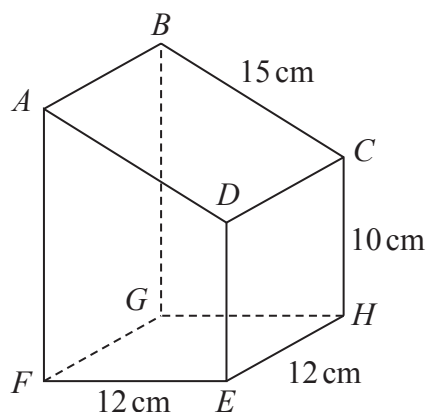


M is the midpoint of the edge GH .

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.

$$DE = CH = 10 \text{ cm}$$

$$AD = BC = 15 \text{ cm}$$

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

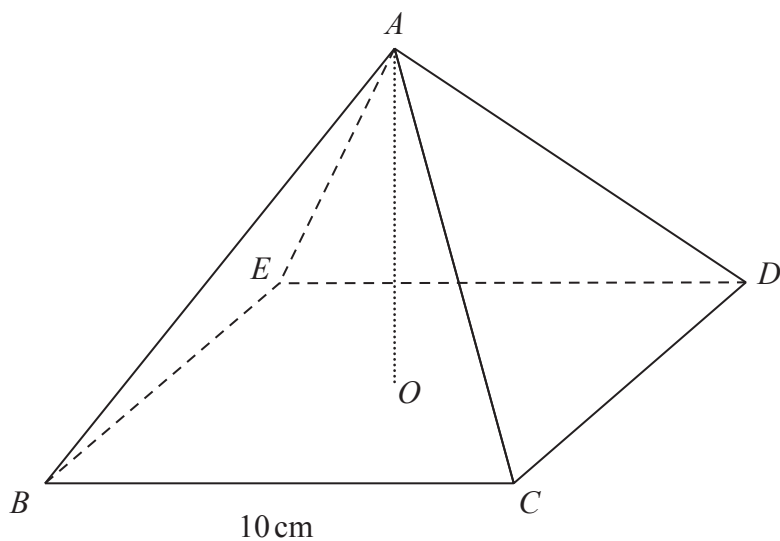
.....
(3)

- (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 $AB = AC = AD = AE$

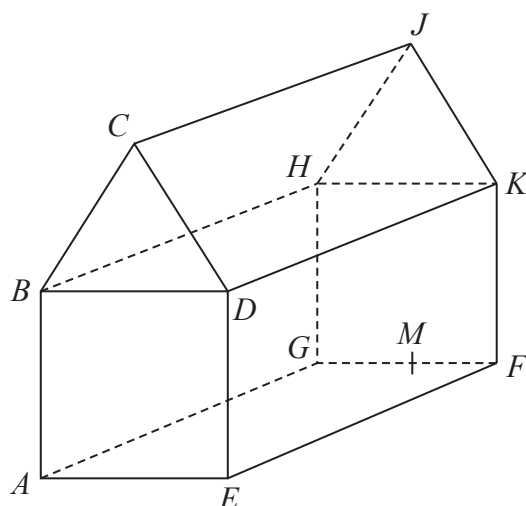
The **total** surface area of the pyramid is 360 cm^2

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

o

(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 $MAJ = y^\circ$

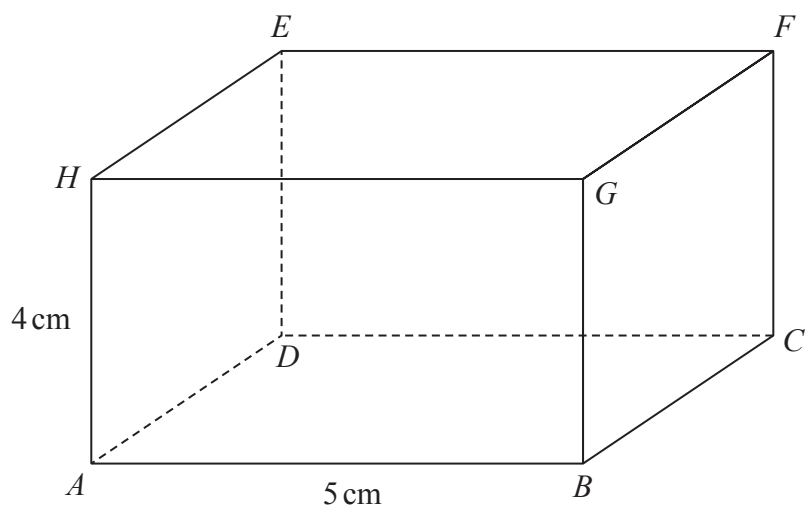
Given that $\tan y^\circ = T$

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

$$T = \dots\dots\dots$$

(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°

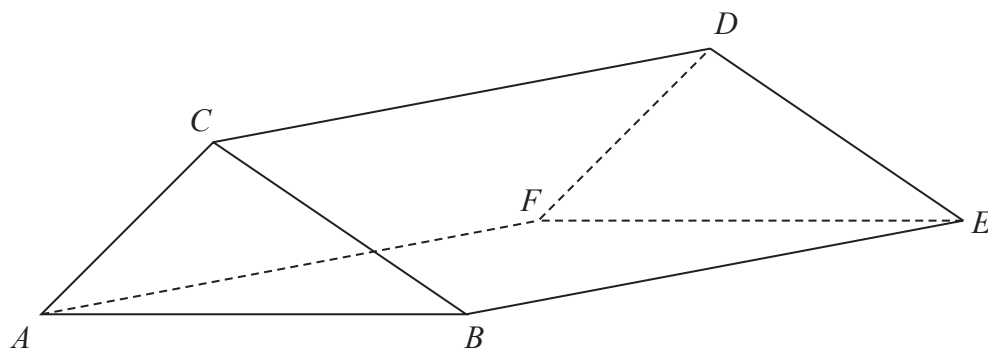
Calculate the volume of the cuboid.

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 $BEC = 40^\circ$ and angle ACB is obtuse.
 $AC = 6\text{ cm}$ and $CE = 13\text{ cm}$

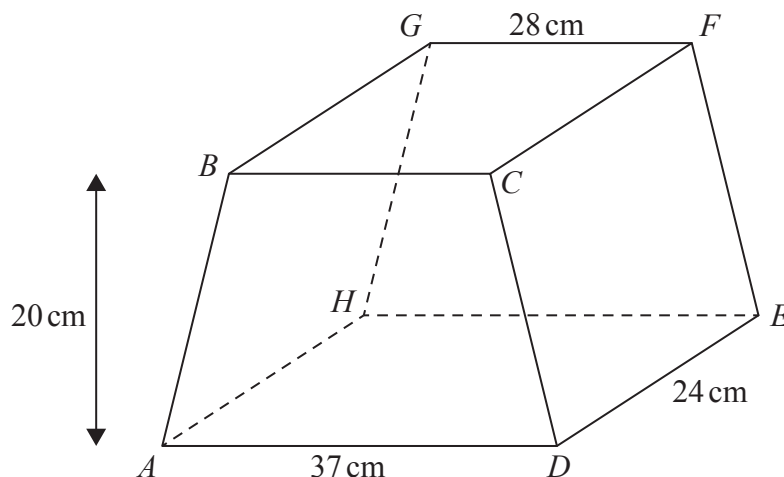
The area of triangle ABC is 22 cm^2

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 $BA = CD$.

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

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

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

..... cm^2

(4)

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

o

.....
(3)

(Total for Question 13 is 7 marks)

22 The diagram shows a cone.

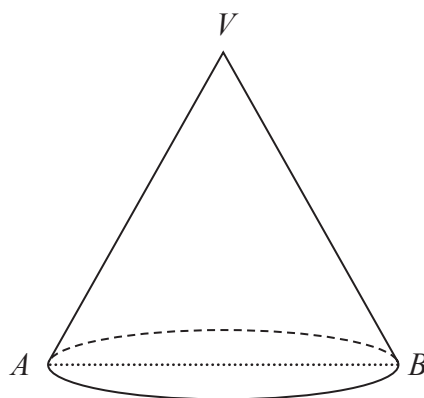


Diagram **NOT**
accurately drawn

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 22 is 6 marks)

