

G278 3D Pythagoras and trigonometry

Q1.

The diagram shows cuboid $ABCDEFGH$.

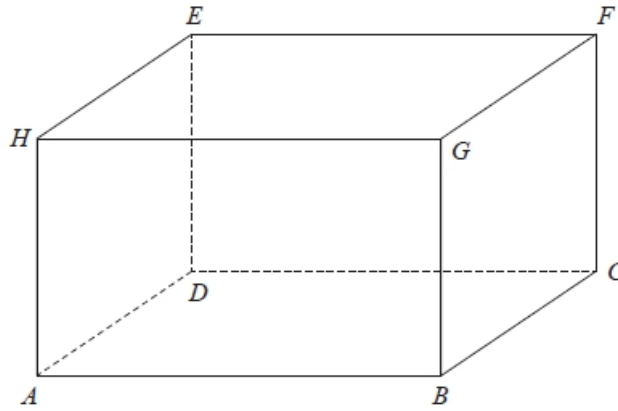


Diagram NOT
accurately drawn

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 = 3 marks)

Q2.

The diagram shows a triangular prism.

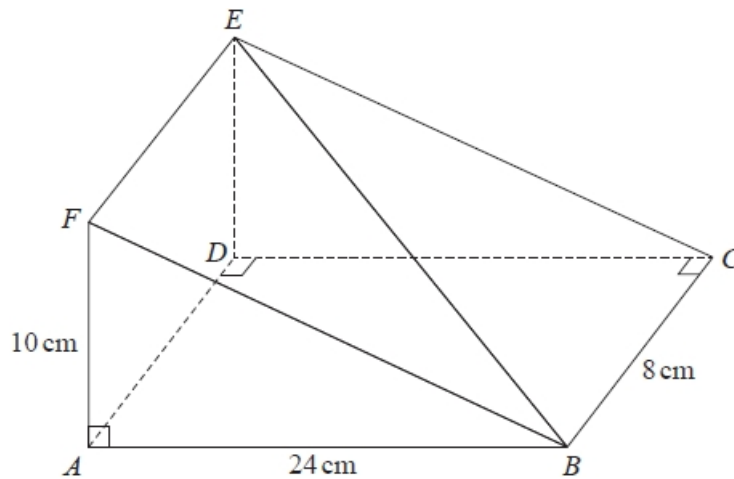


Diagram NOT
accurately drawn

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

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 = 3 marks)

Q3.

The diagram shows a cuboid $ABCDEFGH$.

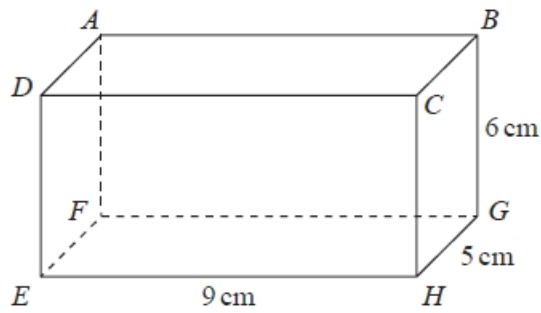


Diagram **NOT**
accurately drawn

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

Work out the size of the angle between AH and the plane $EFGH$.

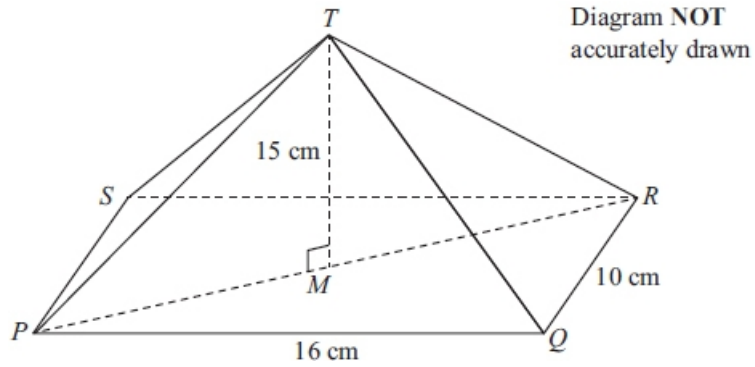
Give your answer correct to 3 significant figures.

.....°

(Total for question = 4 marks)

Q4.

The diagram shows a pyramid with a horizontal rectangular base $PQRS$.
 $PQ = 16$ cm.
 $QR = 10$ cm.
 M is the midpoint of the line PR .
The vertex, T , is vertically above M .
 $MT = 15$ cm.



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

.....°

(Total for question = 4 marks)

Q5.

The diagram shows a cube $ABCDEFGH$.

The sides of the cube are of length 5 cm.

Calculate the size of the angle between the diagonal AH and the base $EFGH$. Give your answer correct to 1 decimal place.

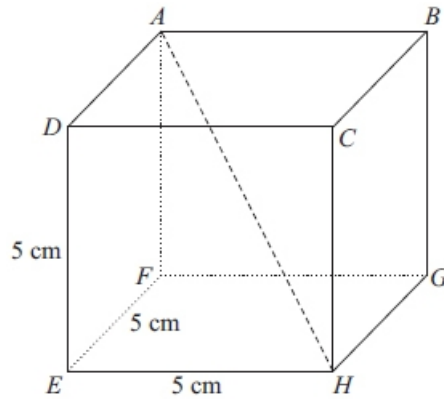


Diagram NOT
accurately drawn

.....°

(Total for question = 4 marks)

Q6.

The diagram shows a triangular prism with a horizontal rectangular base $ABCD$.
 $AB = 10$ cm. $BC = 7$ cm.
 M is the midpoint of AD .
The vertex T is vertically above M .
 $MT = 6$ cm.

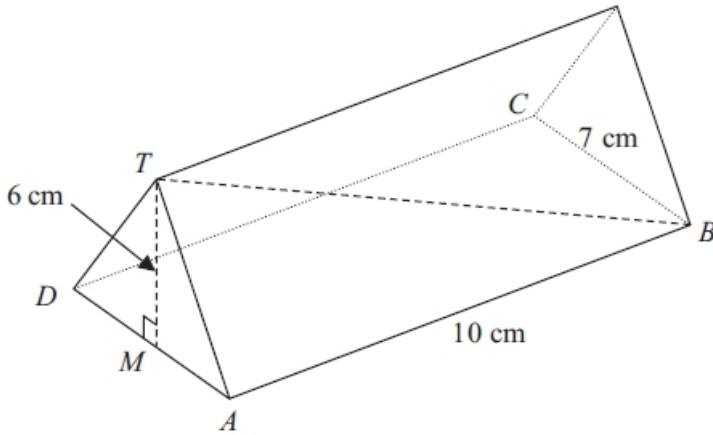


Diagram NOT
accurately drawn

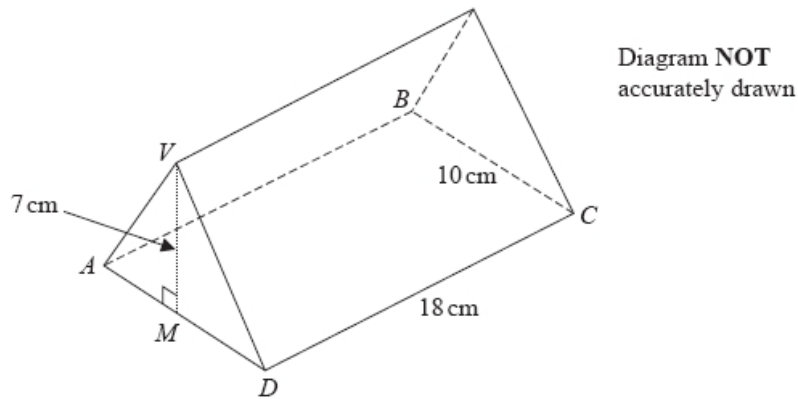
Calculate the size of the angle between TB and the base $ABCD$.
Give your answer correct to 1 decimal place.

.....°

(Total for question = 4 marks)

Q7.

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



M is the midpoint of AD .

The vertex V is vertically above M .

$DC = 18 \text{ cm}$, $BC = 10 \text{ cm}$, $MV = 7 \text{ cm}$.

Calculate the size of the angle between VC and the plane $ABCD$.

Give your answer correct to 3 significant figures.

.....°

(Total for question = 4 marks)

Q8.

$ABCDE$ is a square-based pyramid.

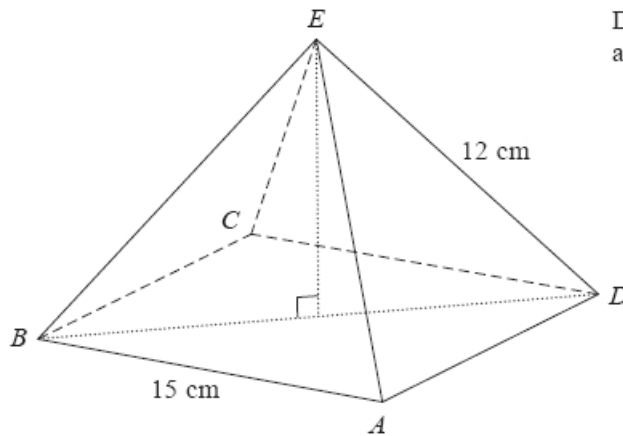


Diagram **NOT**
accurately drawn

$$AE = BE = CE = DE = 12 \text{ cm}$$

$$AB = 15 \text{ cm}$$

Calculate the size of angle DEB .

Give your answer to the nearest degree.

.....°

(Total for question = 4 marks)

Q9.

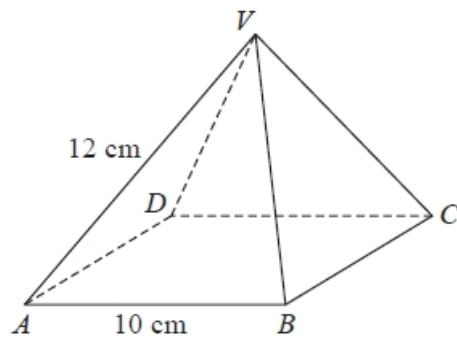


Diagram **NOT**
accurately drawn

$ABCD$ is the square base of the pyramid $VABCD$.

$AB = BC = CD = DA = 10$ cm.

$VA = VB = VC = VD = 12$ cm.

Calculate the height of the pyramid.

Give your answer correct to 3 significant figures.

..... cm

(Total for question = 4 marks)

Q10.

ABCDEFGH is a cuboid.

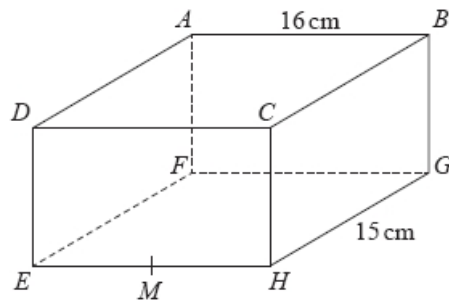


Diagram **NOT** accurately drawn

$AB = 16$ cm and $HG = 15$ cm.

M is the midpoint of EH .

BM makes an angle of 24° with the base $EFGH$.

Calculate the height, BG , of the cuboid.

Give your answer correct to 3 significant figures.

..... cm

(Total for question = 4 marks)

Q11.

$ABCDEFGH$ is a cuboid.

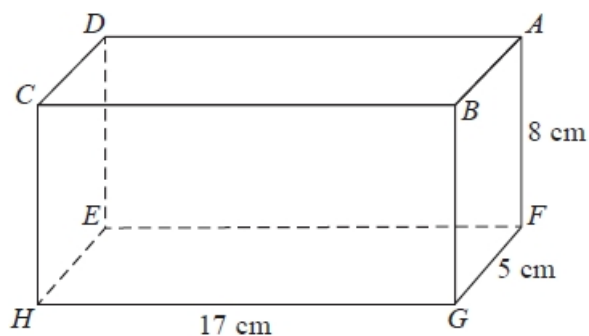


Diagram **NOT**
accurately drawn

The cuboid has

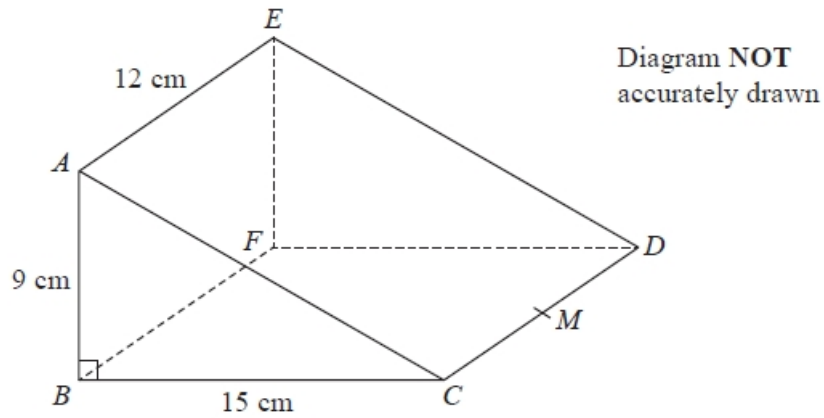
length 17 cm
width 5 cm
height 8 cm

Work out the size of the angle that AH makes with the plane $EFGH$.
Give your answer correct to 1 decimal place.

.....°

(Total for question = 4 marks)

Q12.



$ABCDEF$ is a triangular prism.
 $AB = 9$ cm, $BC = 15$ cm and $AE = 12$ cm.
Angle $ABC = 90^\circ$
 M is the midpoint of CD .

Calculate the size of the angle between AM and the plane $BCDF$.
Give your answer correct to 1 decimal place.

.....^o

(Total for Question is 5 marks)

Q13.

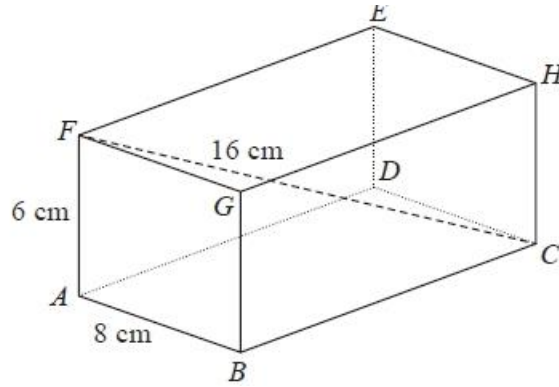


Diagram NOT
accurately drawn

The diagram shows a cuboid $ABCDEFGH$.
 $AB = 8$ cm, $AF = 6$ cm and $FC = 16$ cm.

- (a) Find the length of BC .
Give your answer correct to 3 significant figures.

$BC = \dots\dots\dots$ cm
(3)

- (b) Find the size of the angle between the line FC and the plane $ABGF$.
Give your answer correct to 1 decimal place.

$\dots\dots\dots^\circ$
(2)

(Total for Question is 5 marks)

Q14.

The diagram shows a cuboid $ABCDEFGH$.

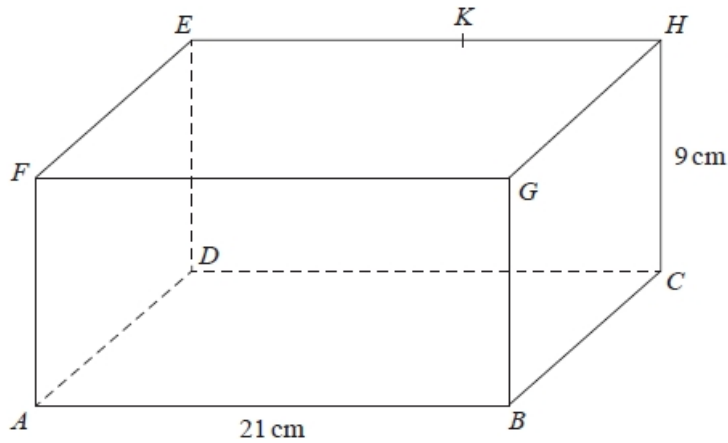


Diagram NOT accurately drawn

$AB = 21$ cm and $CH = 9$ cm.

K is the point on EH such that angle $AKB = 68^\circ$ and $BK = 16.5$ cm.

(a) Calculate the size of angle BAK .

Give your answer correct to 1 decimal place.

.....^o

(3)

(b) Calculate the size of the angle between the line BK and the plane $ABCD$.

Give your answer correct to 1 decimal place.

.....^o

(2)

(Total for question = 5 marks)

Q15.

A pyramid has a horizontal square base $ABCD$ with sides of length 230 metres.
 M is the midpoint of AC .
The vertex, T , is vertically above M .
The slant edges of the pyramid are of length 218 metres.



Calculate the height, MT , of the pyramid.
Give your answer correct to 3 significant figures.

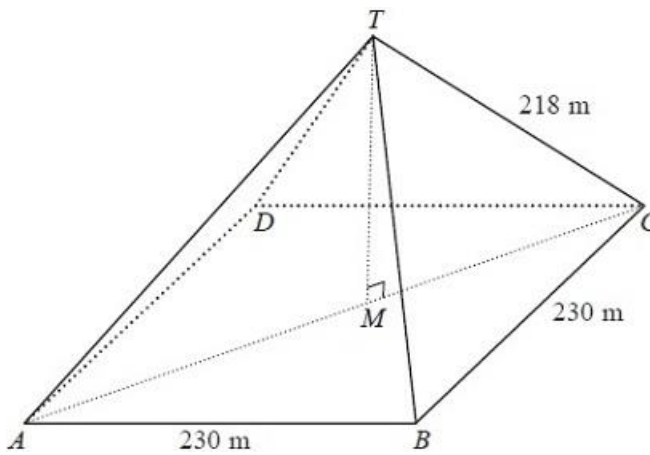


Diagram **NOT**
accurately drawn

..... m

(Total for Question is 5 marks)