Name	Class

🎓 MATHS TEACHER HUB

www.MathsTeacherHub.com

3D Trigonometry
(9 – 1) Topic booklet
Higher

These questions have been collated from previous years GCSE Mathematics papers.

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser.

Total Marks

Instructions
•Use **black** ink or ball-point pen.
•**Fill in the boxes** at the top of this page with your name, centre number and candidate number.
•Answer **all** questions.
•Answer the questions in the spaces provided
 – *there may be more space than you need*.
•Diagrams are NOT accurately drawn, unless otherwise indicated.
•You must **show all your working out.**
•If the question is a **1H** question you are not allowed to use a calculator.
•If the question is a **2H** or a **3H** question, you may use a calculator to help you answer.

Information
•The marks for **each** question are shown in brackets
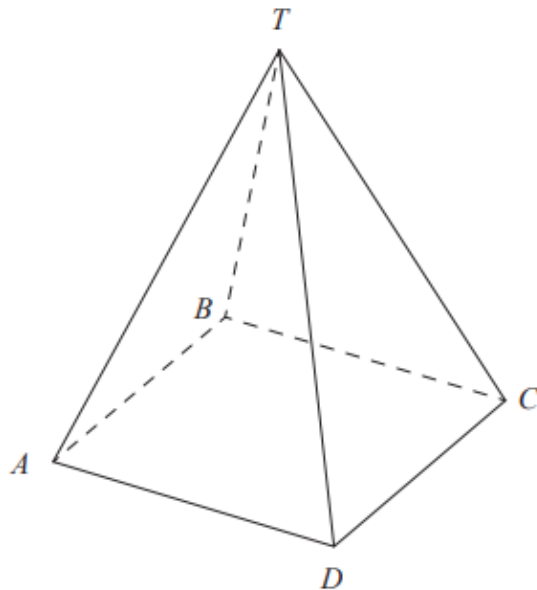 – *use this as a guide as to how much time to spend on each question*.

Advice
•Read each question carefully before you start to answer it.
•Keep an eye on the time.
•Try to answer every question.
•Check your answers if you have time at the end.

Answer ALL questions
Write your answers in the space provided.
You must write down all the stages in your working.
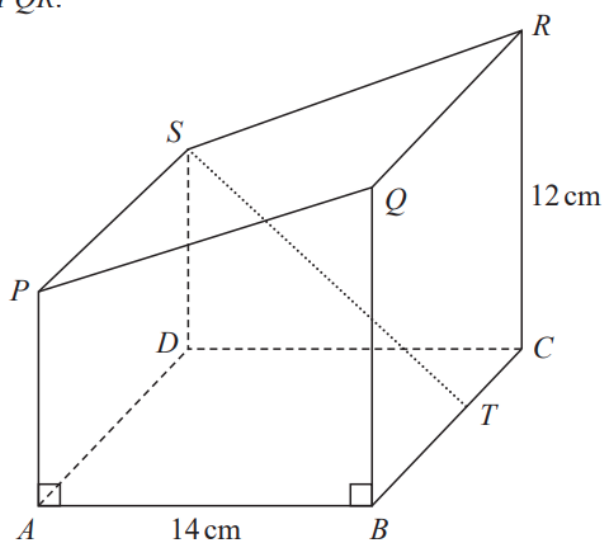
12 Here is a pyramid with a square base $ABCD$.

$AB = 5\,m$

The vertex T is 12 m vertically above the midpoint of AC.

Calculate the size of angle TAC.

....

18 Here is a prism *ABCDSPQR*.

The base *ABCD* of the prism is a square of side 14 cm
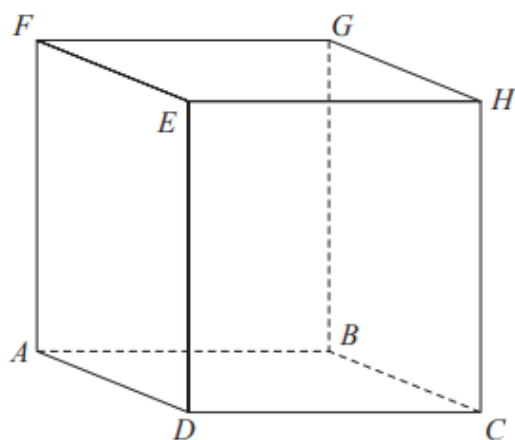*T* is the point on *BC* such that *BT* : *TC* = 4 : 3

The cross section of the prism is in the shape of a trapezium of area 147 cm²
CR = 12 cm

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

.... °

(Total for Question 18 is 5 marks)

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*.
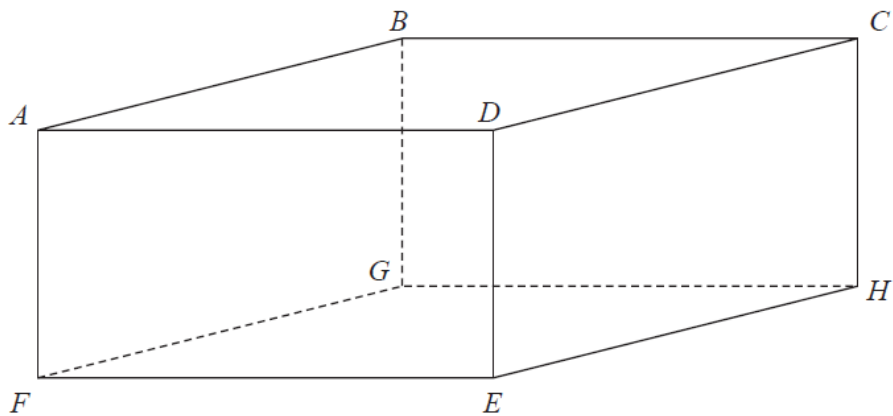Give your answer correct to 1 decimal place.

(Total for Question 18 is 4 marks)

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.

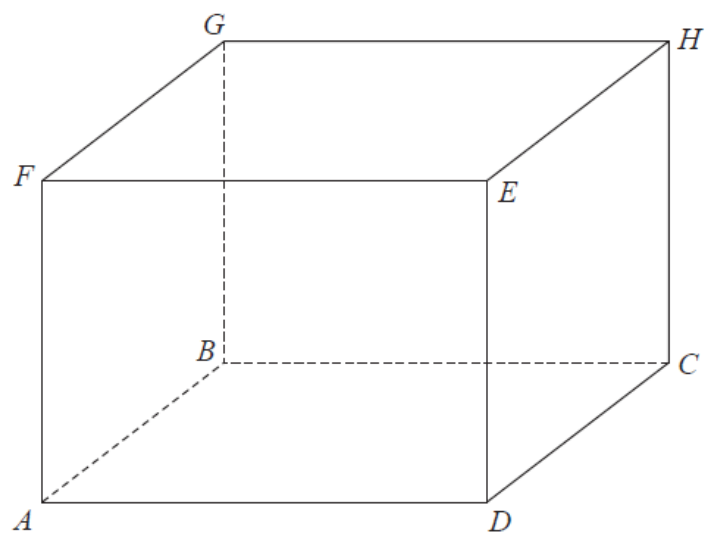**20** *ABCDEFGH* is a cuboid.

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

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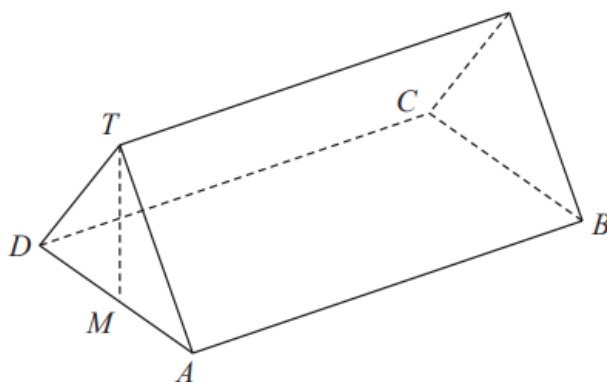Give your answer correct to the nearest degree.

.... °

(Total for Question 20 is 4 marks)

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)

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.

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

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)