

Name

Class



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# 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 **1F** question you are not allowed to use a calculator.
- If the question is a **2F** or a **3F** 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

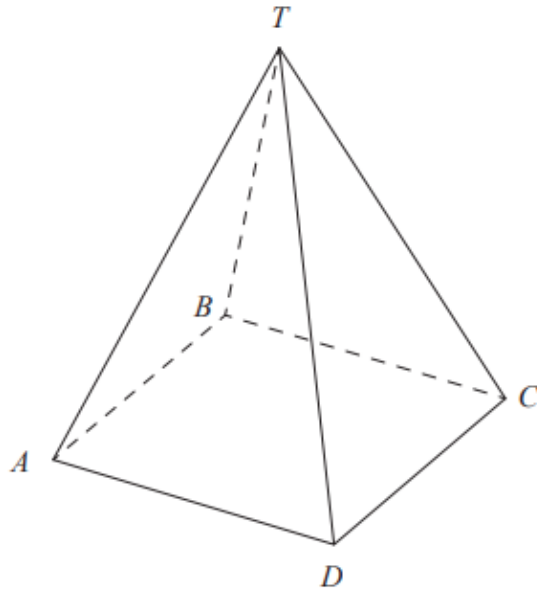
- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

**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  $ABCD$ .

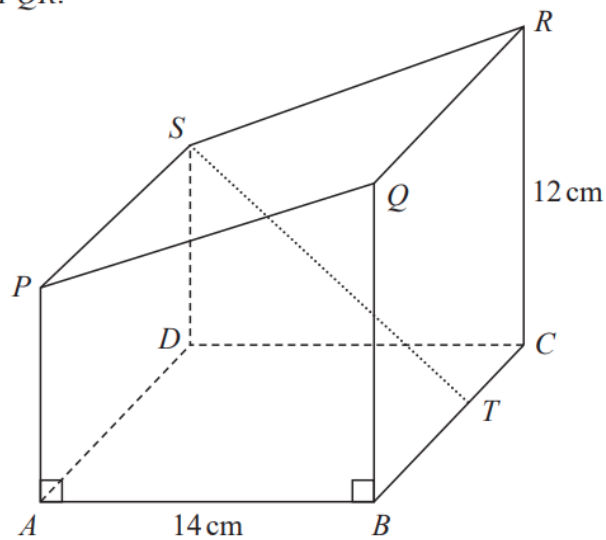


$$AB = 5 \text{ m}$$

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

Calculate the size of angle  $TAC$ .

18 Here is a prism  $ABCDSPQR$ .

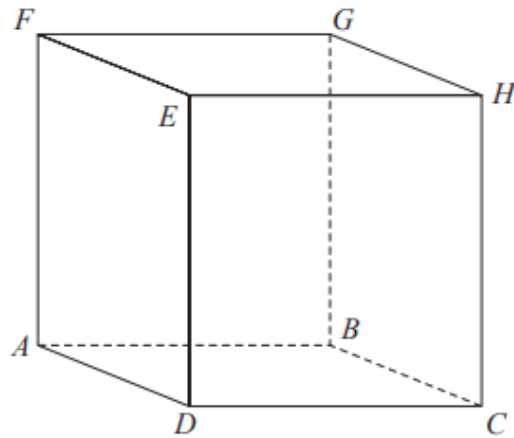


The base  $ABCD$  of the prism is a square of side  $14\text{ cm}$   
 $T$  is the point on  $BC$  such that  $BT:TC = 4:3$

The cross section of the prism is in the shape of a trapezium of area  $147\text{ cm}^2$   
 $CR = 12\text{ cm}$

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

18  $ABCDEFGH$  is a cuboid.



$$AB = 7.3 \text{ cm}$$

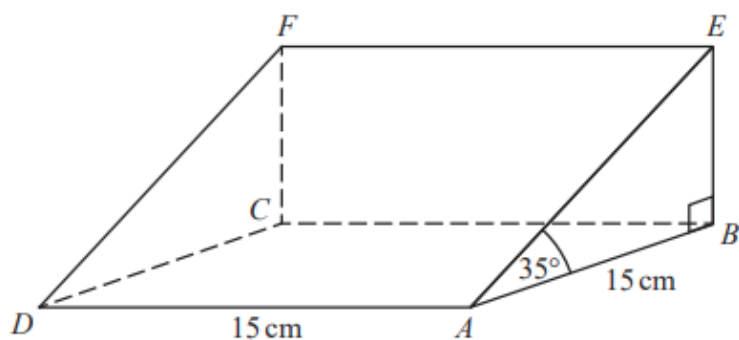
$$CH = 8.1 \text{ cm}$$

$$\text{Angle } BCA = 48^\circ$$

Find the size of the angle between  $AH$  and the plane  $ABCD$ .

Give your answer correct to 1 decimal place.

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  $EAB = 35^\circ$

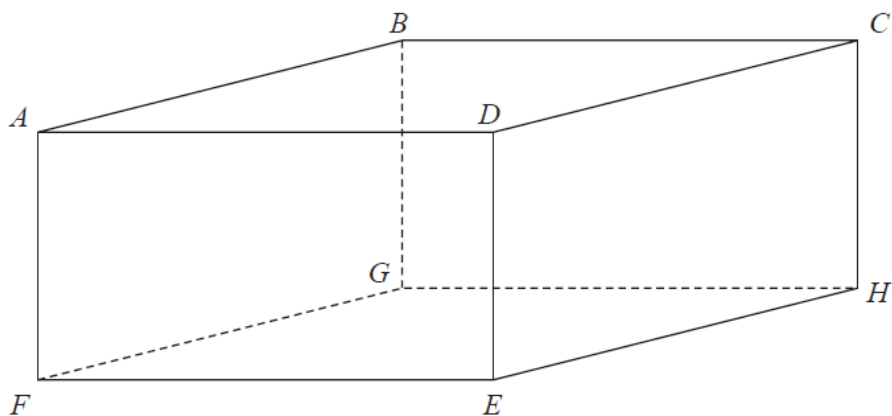
$M$  is the point on  $DA$  such that

$$DM:MA = 2:3$$

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.



$$AD = 9 \text{ cm}$$

$$FD = 13 \text{ cm}$$

$$\text{Angle } GHF = 49^\circ$$

Work out the size of angle  $FAH$ .

Give your answer correct to the nearest degree.