HIGHER

# 7.15 3d Pythagoras and Trigonometry: 30-minute Pack

Total Marks

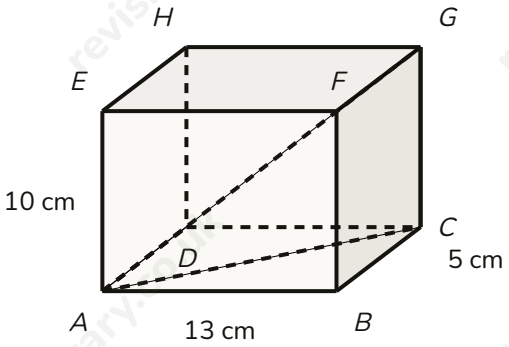
EDEXCEL 1MA1 · Calculator allowed · about 30 minutes

Name: _____ Date: ____ / ____ / _____

**Answer ALL questions. Show all your working.**

**1** ABCDEFGH is a cuboid with AB = 13 cm, BC = 5 cm and AE = 10 cm, where ABCD is the base and AE is a vertical edge. Work out the size of the angle between the diagonal AG and the base ABCD. Give your answer correct to 1 decimal place.

Diagram NOT accurately drawn

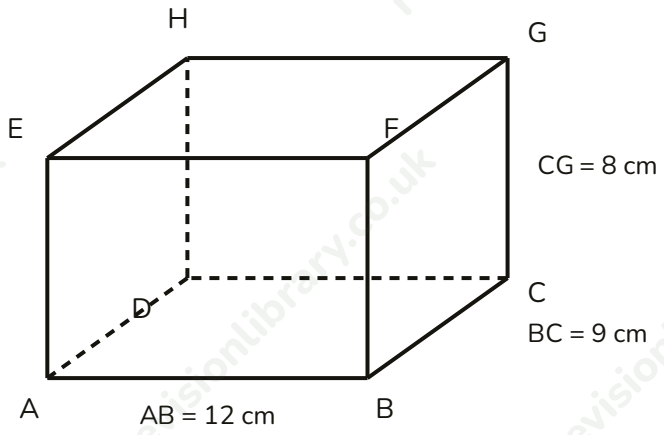



**(Total for Question 1 is 4 marks)**


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**2** The diagram shows a cuboid ABCDEFGH with AB = 12 cm, BC = 9 cm and CG = 8 cm. E, F, G and H are directly above A, B, C and D respectively.

Diagram NOT accurately drawn




**(a)** Calculate the length of the diagonal AC of the base ABCD. **(2)**

.....

**(b)** Hence calculate the length of the diagonal AG of the cuboid. **(2)**

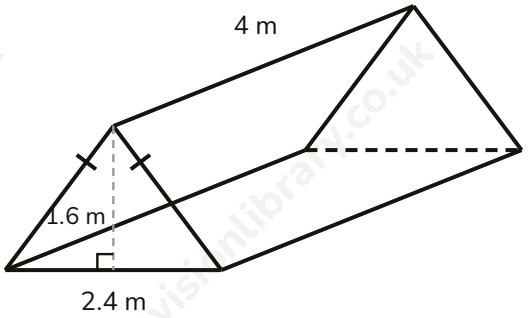
.....

**(Total for Question 2 is 4 marks)**


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**3** The diagram shows a tent in the shape of a triangular prism of length 4 m. The triangular cross-section is isosceles, with base 2.4 m and vertical height 1.6 m.

Diagram NOT accurately drawn




**(a)** Calculate the slant length of one sloping side of the triangular cross-section. **(2)**

.....

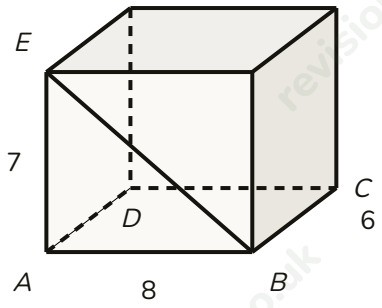
**(b)** The rectangular sloping side panel of the tent has width equal to the slant length found in part (a) and length 4 m (the length of the tent). Calculate the length of the diagonal of this rectangular panel, giving your answer to 3 significant figures. **(3)**

.....

**(Total for Question 3 is 5 marks)**


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**4** A cuboid has corners with coordinates A(0,0,0), B(8,0,0), D(0,6,0) and E(0,0,7). Find the angle between the line EB and the base plane ABCD. Give your answer to 1 decimal place.

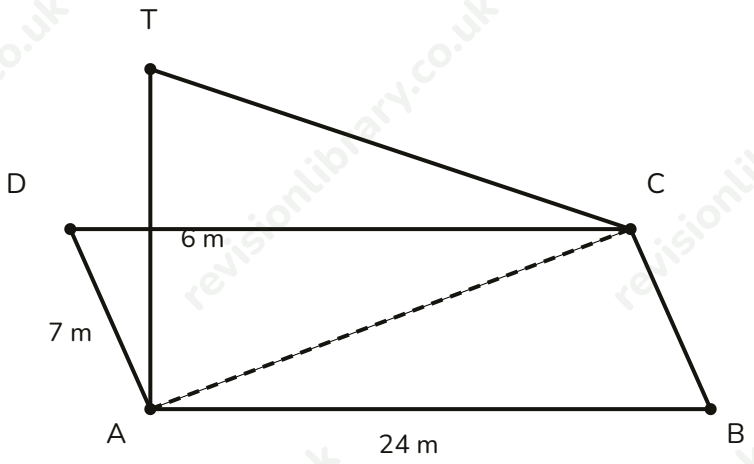



**(Total for Question 4 is 5 marks)**


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**5** A gardener, Amara, is laying out a horizontal rectangular field ABCD with AB = 24 m and AD = 7 m. A vertical flagpole stands at corner A, with its top at point T, where AT = 6 m. A wire connects the top of the flagpole, T, to the opposite corner C of the field.

Diagram NOT accurately drawn




**(a)** Calculate the distance AC, the diagonal of the field. **(2)**

.....

**(b)** Calculate the length of the wire TC, giving your answer to 3 significant figures. **(3)**

.....

**(Total for Question 5 is 5 marks)**


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# Mark scheme · 7.15 3d Pythagoras and Trigonometry: 30-minute Pack

## Question 1

| | |
|---|---|
| AC = $\sqrt{13^2 + 5^2}$ = 13.928 | **M1** |
| tan x = 10/AC | **M1** |
| inverse tan used | **M1** |
| 35.7 degrees cao | **A1** |

**Answer: 35.7 degrees**

## Question 2

| | |
|---|---|
| (a) $\sqrt{12^2 + 9^2}$ | **M1** |
| (a) 15 cm cao | **A1** |

**(a) Answer: 15 cm**

| | |
|---|---|
| (b) $\sqrt{15^2 + 8^2}$ using their (a) ft | **M1** |
| (b) 17 cm cao | **A1** |

**(b) Answer: 17 cm**

## Question 3

| | |
|---|---|
| (a) $\sqrt{1.2^2 + 1.6^2}$ | **M1** |
| (a) 2 m cao | **A1** |

**(a) Answer: 2 m**

| | |
|---|---|
| (b) $\sqrt{4^2 + (\text{their } 2)^2}$ ft | **M1** |
| (b) $\sqrt{20}$ evaluated | **M1** |
| (b) awrt 4.47 m | **A1** |

**(b) Answer: 4.47 m (3 s.f.)**

## Question 4

| | |
|---|---|
| identify projection of EB on base has length equal to horizontal distance between B and projection of E = distance between (8,0,0) and (0,0,0) = 8 | **M1** |
| use tan(θ) = vertical / horizontal = 7 / 8 oe | **M1** |
| calculate θ = arctan(7/8) oe | **M1** |
| 41.2 degrees awrt | **A1** |
| units stated (degrees) or clear final answer with units | **B1** |

**Answer: 41.2 degrees (awrt)**

## Question 5

| | |
|---|---|
| (a) $\sqrt{24^2 + 7^2}$ | **M1** |
| (a) 25 m cao | **A1** |

**(a) Answer: 25 m**

| | |
|---|---|
| (b) $\sqrt{6^2 + (\text{their AC})^2}$ ft | **M1** |
| (b) $\sqrt{661}$ evaluated | **M1** |
| (b) awrt 25.7 m | **A1** |

**(b) Answer: 25.7 m (3 s.f.)**


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