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Name:

Date:

3D PYTHAGORAS

GCSE

Edexcel

Mathematics

Grade 7

Mark	Grade
/25	

Materials

For this paper you must have:

- Ruler
- Pencil and Rubber
- Scientific calculator, which you are expected to use when appropriate

Instructions

- Answer all questions
- Answer questions in the space provided
- All working must be shown

Information

- The marks for the questions are shown in brackets

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1.

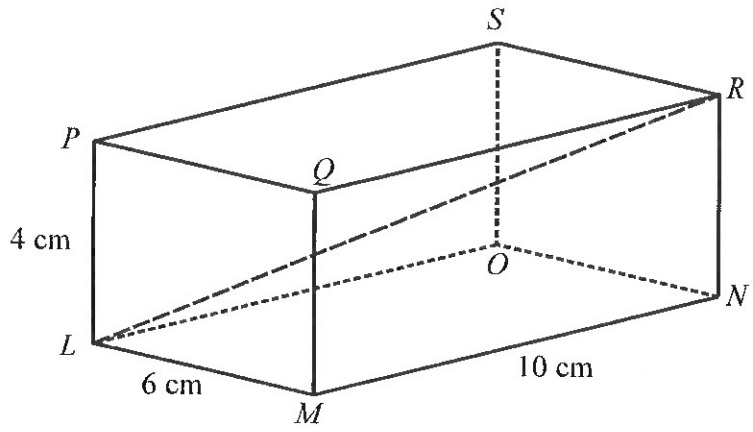

Diagram **NOT** accurately drawn

The diagram represents a cuboid *LMNOPQRS*.

LM = 6 cm.
MN = 10 cm.
LP = 4 cm.

Calculate the length of *LR*.

Give your answer correct to 3 significant figures.

$LR = \sqrt{6^2 + 10^2 + 4^2}$

$= \sqrt{36 + 100 + 16}$

$= \sqrt{152}$

$= 2\sqrt{38}$

$= 12.3$ cm (3 s.f.)

12.3 cm

(Total for question 1 is 3 marks)

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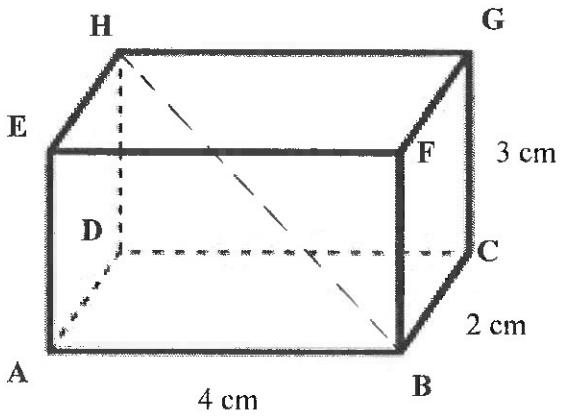
2 Shown below is a cuboid



Calculate the length of diagonal BH.
Give your answer as a surd.

$BH = \sqrt{4^2 + 2^2 + 3^2}$

$= \sqrt{16 + 4 + 9}$

$= \sqrt{29}$ cm

(Total for question 2 is 4 marks)

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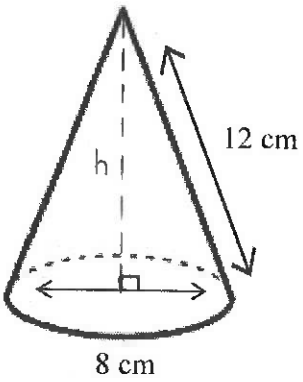
3



Calculate the volume of the cone to 2 significant figures.

$d = 8$ cm

$r = 4$ cm

$h = \sqrt{12^2 - 4^2}$

$= \sqrt{144 - 16}$

$= \sqrt{128}$

$= 8\sqrt{2}$

$V = \pi r^2 \frac{h}{3}$

$= \pi \times 4^2 \times \frac{8\sqrt{2}}{3}$

$= \pi \times 16 \times \frac{8\sqrt{2}}{3}$

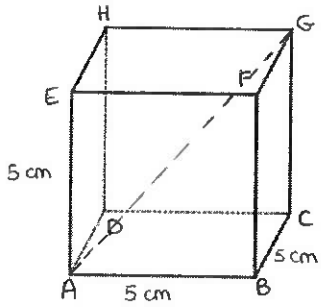
$= \frac{128}{3}\sqrt{2}\,\pi$

$= 190 \text{ cm}^3$ (2 s.f.)

.....190.....cm³

(Total for question 3 is 3 marks)

4 Shown is a cube with side length 5cm.



Calculate the length AG.
Give your answer as a surd.

$AG = \sqrt{5^2 + 5^2 + 5^2}$

$= \sqrt{25 + 25 + 25}$

$= \sqrt{75}$

$= 5\sqrt{3}$ cm

.....$5\sqrt{3}$.....cm

(Total for question 4 is 3 marks)

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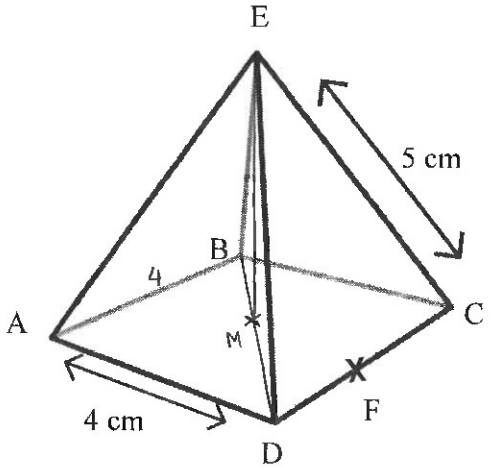
5 Shown is a square based pyramid, ABCDE.



F is the midpoint of CD
AD = 4cm and CE = 5cm

Calculate the length of:

(a) BD to 1 decimal place.

$BD^2 = 4^2 + 4^2$

$= 16 + 16$

$= 32$

$BD = \sqrt{32}$

$= 5.7$ cm (1 d.p.)

.....5.7.....cm

(2)

(b) EF to 2 decimal places.

$ME^2 = 5^2 - 2.828427125^2$

$ME^2 = 17$

$ME = \sqrt{17}$

$ME = 4.123105626$ cm

$MF = 2$ cm

$EF^2 = 2^2 + 4.123105626^2$

$EF^2 = 21$

$EF = \sqrt{21}$

$EF = 4.58$ cm (2 d.p)

.....4.58.....cm

(4)

(Total for question 5 is 6 marks)

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6 A cuboid has length 4 cm, width 5 cm and height 15 cm.

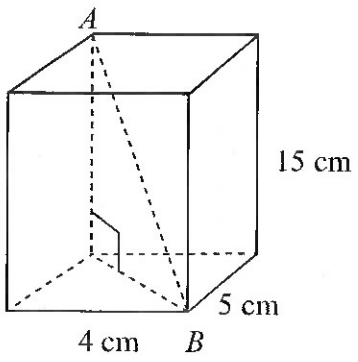

Diagram **NOT** accurately drawn

Work out the length of AB to 3 significant figures.

$AB = \sqrt{4^2 + 5^2 + 15^2}$

$= \sqrt{16 + 25 + 225}$

$= \sqrt{266}$

$= 16.3$ cm (3 s.f.)

16.3 cm

(Total for question 6 is 3 marks)

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7 The diagram shows a pyramid. The apex of the pyramid is V.

Each of the sloping edges is of length 8 cm.

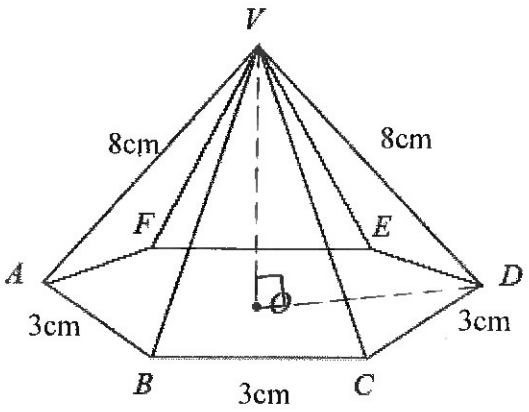


Diagram **NOT** accurately drawn

The base of the pyramid is a regular hexagon with sides of length 3 cm.

O is the centre of the base.

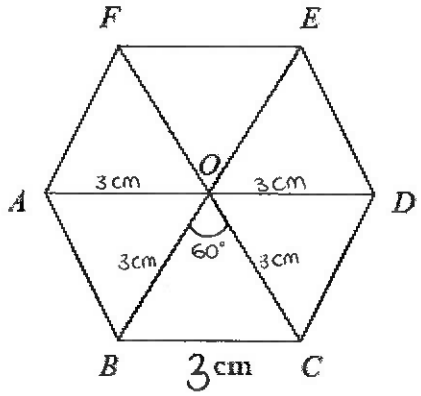


Diagram **NOT** accurately drawn

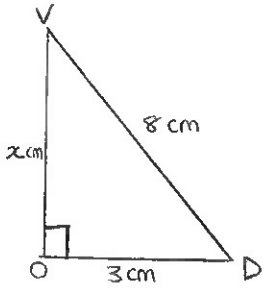
Calculate the height of *V* above the base of the pyramid.
Give your answer correct to 3 significant figures.

$x = \sqrt{8^2 - 3^2}$

$= \sqrt{64 - 9}$

$= \sqrt{55}$

$= 7.42$ cm (3 s.f.)



.....7.42.....cm

(Total for question 7 is 3 marks)

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