1. The total surface area of a cube is 294 cm^2.

Work out the volume of the cube.

049
$6 \overline{)294}$

$SA = 6 \times x^2$
↑ length of side

$6x^2 = 294$
$\div 6 \quad \div 6$
$x^2 = 49$
$\sqrt{} \quad \sqrt{}$
$x = \sqrt{49}$
$x = 7$

volume = length × width × height
volume $= 7 \times 7 \times 7$
$= 49 \times 7$
$= 343 \text{ cm}^3$

x	40	9
7	280	63

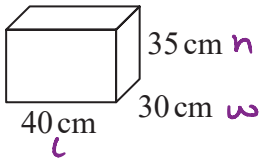
$280 + 63 = 343$

343 cm^3

(Total for Question is 4 marks)

2. Chloe has a van.

She is going to use the van to deliver boxes.
Each box is a cuboid, 40 cm by 30 cm by 35 cm.



1m = 100cm

The space for boxes in the van has

maximum length	2.4 m	= 240 cm
maximum width	1.5 m	= 150 cm
maximum height	1.4 m	= 140 cm

The space for boxes is empty.
Chloe wants to put as many boxes as possible into the van.

She can put 3 boxes into the van in one minute.
Assume that the space for boxes is in the shape of a cuboid.

(a) Work out how many minutes it should take Chloe to put as many boxes as possible into the van.

$\frac{240}{40}$ = 6 boxes along length

$\frac{150}{30}$ = 5 boxes along width

$\frac{140}{35}$ = 4 boxes along height ✓

6 × 5 × 4 = 120 boxes in van ✓

3 boxes in 1 min
↓ ×40 ↓ ×40
120 boxes in 40 mins ✓

40 ✓ minutes

(4)

The space for boxes might **not** be in the shape of a cuboid.

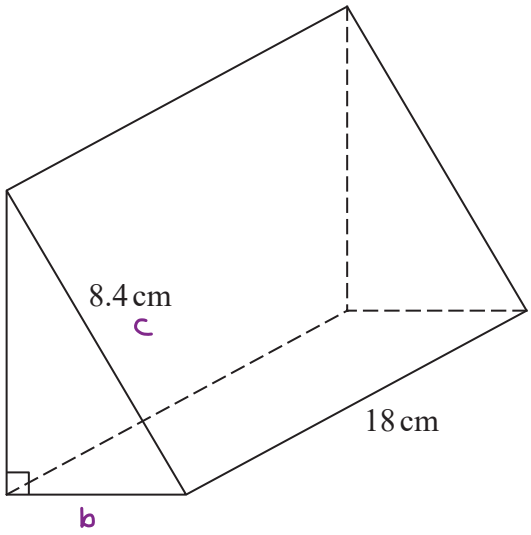
(b) Explain how this could affect the time it would take Chloe to put as many boxes as possible into the van.

If boxes no longer fit along each edge, then less boxes may fit into the van, meaning it would take less time ✓

(1)

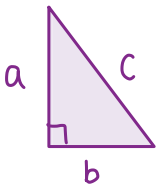
(Total for Question is 5 marks)

3. Here is a triangular prism.



area of triangular face x length

Work out the volume of the prism.
Give your answer correct to 3 significant figures.



Finding b (base of triangle):

$a^2 + b^2 = c^2$ ← pythagorean theorem

$b^2 = c^2 - a^2$

$b^2 = 8.4^2 - 7.2^2$ (1)

$b^2 = 18.72$

$b = \sqrt{18.72}$ (1) ← leave in exact form

Area of triangle:

$A = \frac{1}{2}bh$

$= \frac{1}{2} \times \sqrt{18.72} \times 7.2$

$= 15.57598...$ (1)

Volume of prism:

$15.57598... \times 18 = 280.368...$ (1)

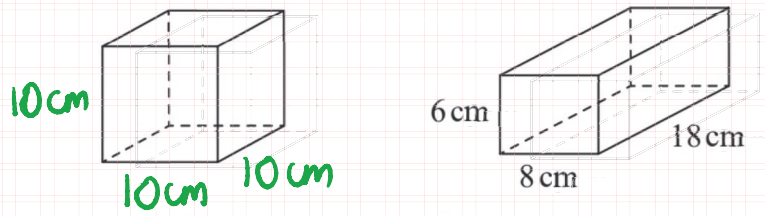
↑ use exact value

3 < 5 so round down to 280 to 3 SF

280 (1) ..... cm^3

(Total for Question is 5 marks)

4. The diagram shows a cube and a cuboid.



The total surface area of the cube is equal to the total surface area of the cuboid.

Janet says,

"The volume of the cube is equal to the volume of the cuboid."

Is Janet correct?
You must show how you get your answer.

SA cuboid: $6 \times 8 = 48\ cm^2$
$6 \times 18 = 108\ cm^2$
$8 \times 18 = 144\ cm^2$

$48 + 108 + 144 = 300\ cm^2$ (1)
$300 \times 2 = 600 cm^2$ (1)

Area of each face in cube must be the same
$\therefore$ area of one face $= \frac{600}{6} = 100 cm^2$

Length of each side in cube must be the same

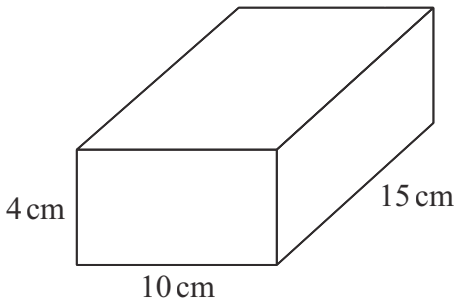
Since area $= 100 cm^2$ each length must be 10cm (1)
(because $10 \times 10 = 100$)

Volume of cube: $10 \times 10 \times 10 = 1000\ cm^3$ ← Volume = h x w x d

Volume of cuboid: $6 \times 8 \times 18 = 864\ cm^3$ (1)

No Janet is not correct since $1000 \neq 864$ (1)

5. Here is a cuboid.



Work out the volume of the cuboid.

$V = L \times W \times d$

$= 10\text{cm} \times 4\text{cm} \times 15\text{cm}$

$\times \begin{array}{r} 15 \\ 4 \\ \hline 60 \\ 2 \end{array}$

$= 10\text{cm} \times 60\text{cm}^2$ ✓1

$= 600\text{cm}^3$ ✓2 ✓3

600 cm^3 ✓

(Total for Question is 3 marks)