Q1.
This is the net of a cube.

What is the volume of the cube?

Q2.

Cuboids
You can make only four different cuboids with 16 cubes.

<table>
<thead>
<tr>
<th></th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cuboid A</td>
<td>1 1 16</td>
</tr>
<tr>
<td>Cuboid B</td>
<td>1 2 8</td>
</tr>
<tr>
<td>Cuboid C</td>
<td>1 4 4</td>
</tr>
<tr>
<td>Cuboid D</td>
<td>2 2 4</td>
</tr>
</tbody>
</table>

(a) Which of the cuboids A and D has the larger surface area?

Tick (✔) the correct answer below.

Cuboid A

Cuboid D
(b) Which cuboid has the **largest volume**?

Tick (✔️) the correct answer below.

- Cuboid A
- Cuboid B
- Cuboid C
- Cuboid D
- All the same

(c) How many of **cuboid D** make a cube of dimensions 4 × 4 × 4?

________________________

(d) You can make only six **different** cuboids with **24 cubes**.

Complete the table to show the dimensions.

Two have been done for you.
Q3.

Wedges

This door wedge is the shape of a prism.

(a) The shaded face of the door wedge is a trapezium.

Calculate the area of the shaded face.

(b) Calculate the volume of the door wedge.
Q4.

Salt

(a) What is the volume of this standard size box of salt?

(b) What is the volume of this special offer box of salt, which is 20% bigger?
The **standard size** box contains enough salt to fill up **10** salt pots

(c) How many salt pots may be filled up from the **special offer** box of salt?

Q5.

How much water is in this container?
Q6.

The two cuboids have the same volume.

Calculate the length $x$.

(Not to scale)

Q7.

Amit has some small cubes.

The edge of each cube is 1.5 centimetres.
He makes a larger cube out of the small cubes.

The volume of this larger cube is 216 cm$^3$.

How many small cubes does he use?

Q8.

A cuboid has a square base.

It is twice as tall as it is wide.

Its volume is 250 cubic centimetres.

Calculate the width of the cuboid.
Q9.

Here is a trapezium with a height of 10 centimetres.

The parallel sides are 5.5 cm long and 10.5 cm long.

Find the area of the trapezium.
Q10.

Cleo has 24 centimetre cubes.

She uses all 24 cubes to make a cuboid with dimensions 6 cm, 2 cm and 2 cm.

Write the dimensions of a different cuboid she can make using all 24 cubes.

______________ cm, ______________ cm and ______________ cm

Jon has 20 centimetre cubes.
He wants to make a cube with edges that are 3 cm long.

How many more centimetre cubes does he need?

Q11.
Amina made this cuboid using centimetre cubes.

\[ \text{Not actual size} \]

\[ \begin{array}{c}
\text{4 cm} \\
\hline
\text{6 cm} \\
\hline
\text{3 cm}
\end{array} \]

Stefan makes a cuboid that is 5 cm longer, 5 cm taller and 5 cm wider than Amina’s cuboid.

What is the difference between the number of cubes in Amina’s and Stefan’s cuboids?

Q12.

The cube and cuboid have equal volumes.
Calculate the height of the cuboid.

Q13.

This shape is made of wooden centimetre cubes.
How many more centimetre cubes are needed to make it into a solid cuboid 3 cm tall, 5 cm long and 5 cm wide?
Mark schemes

Q1.

125

Q2.

(a) Indicates Cuboid A and gives a correct explanation

The most common correct explanations:

Show the correct surface area for both A and D
eg

• The surface area of A is 66, but D is 40

Consider the number of cube faces that are not visible
eg

• Each cube in D has 3 or 4 faces that cannot be seen but each cube in A has only 1 or 2
• Fewer faces of the cubes are touching each other in A

Consider the number of cube faces that are visible
eg

• In A the cubes show 4 or 5 faces, but in D it’s 2 or 3
• There are more cube faces facing out on A than on D

Ignore

Accept minimally acceptable explanation
eg, for the correct surface areas
• 66 and 40 seen
• 4 × 16 + 2 is bigger than 4 × 8 + 8
eg, for cube faces that are not visible
• There are fewer hidden faces in A
• D is more compact

eg, for cube faces that are visible
• Cubes in A show 4 or more faces, D shows less than 4
• A has more faces showing
• A is more spread out

Use of ‘sides’ for cube faces

Condone
eg, accept

More sides face out on A

Descriptors of cube faces

Note that pupils use a wide range of terms to describe the cube faces
eg, for cube faces that are not visible
• Hidden faces
• Faces pointing inside
• Faces touching
eg, for cube faces that are visible
• Faces facing out
• Faces showing
• Faces you can see
Condone provided the pupil does not explicitly refer to the area of only one of the faces of each cuboid
eg, do not accept
• You can see 8 faces on D and 16 faces on A

Do not accept use of ‘square’ for cube or cuboid
eg
• You can see more of each square’s surface in A than in D

Do not accept explanation is simply a description of one or both of the cuboids
eg
• In A all 16 are in a line and not on top of each other
• D is two cubes high

Do not accept incorrect statement
eg
• Each cube in A shows 4 faces; D is 3

(b) Indicates All the same

1

(c) 4

1

(d) Shows, in any order, all four correct sets of dimensions
eg
• 1 3 8
  1 4 6
  2 2 6
  2 3 4

3

or Shows three correct sets of dimensions

2

or Shows two correct sets of dimensions

1

Repeated sets of dimensions
eg
• 1 3 8
  1 8 3(repeated)
  2 2 6
  6 2 2 (repeated)

Ignore the repeats and mark as 1, 0, 0

Do not accept negative or non-integer dimensions used
Q3.

(a) **For 2m** indicates value is 10.625 rounded or truncated to 1 or more decimal places, eg:

- 10.625
- 10.62
- 10.6

**For only 1m** shows in working the correct substitution into the formula for the area of a trapezium

or

shows in working the trapezium divided into a square and a triangle and substitutes correctly into the formulae for the areas of these, eg:

\[
\frac{(2.5 + 6.0)}{2} \times 2.5
\]

\[
6.0 + 2.5 \div 2 \times 2.5
\]

\[
2.5 \times 2.5 + \frac{1}{2} \times 3.5 \times 2.5
\]

Accept **For 2m** answer given as 10.5 or 11 only if area has been calculated in working as 10.625

(b) Indicates value is 37.1875 rounded or truncated to 1 or more decimal places, eg:

- 37.1875
- 37.19
- 37.2

Accept value given as 37 only if volume has been calculated in working as a value rounding to 37.2

Allow follow thorough where the answer given in part (a) is correctly multiplied by 3.5 (with the result rounded or truncated to 1 or more decimal places) eg:

- 48.125 or 48.1 or 48.12 or 48.13
- if 13.75 is given for (a)
- 38.5 if 11 is given for (a)
- 35 if 10 is given for (a)

Q4.

(a) Indicates 300
Working need not be shown for the award of this mark.

Ignore use of cubed sign eg
- \( 300^3 \)

Do not accept incorrect attempt to convert to different units eg
- \( 3 \)
- \( 30 \)

(b) For 2m indicates 360.

For only 1m shows 60 as 20% of 300 in working or given 60 as volume of the box.

Working need not be shown for the award of any marks.

For 2m or 1m allow follow through from part (a), with correct rounding or truncation.

Award only 1m for correct calculation indicated but not evaluated or incorrectly evaluated eg
- \( 12 \times 6 \times 5 = 432 \)
- \( 1.2 \times 300 \)
- \( 300 \times 20 \div 100 + 300 \)

Do not accept height calculated as 12 with no further attempt to find the volume.

(c) Indicates 12 salt pots.

Working need not be shown for the award of this mark.

Allow follow through from part (a) or (b) with correct rounding or truncation.

Accept any indication eg
- 2 more salt pots drawn on diagram given.

Accept correct description eg
- 2 more salt pots.

Do not accept fractions of a salt pot.

Do not accept fewer than 10 salt pots eg
- 2 salt pots.

Q5.

425 (ml)

[4]

Q6.

5 cm

or

sight of 300(cm³)

[1]
Or
Complete correct method, e.g.

- $5 \times 6 \times 10 \div 12 = 25$
  \[\sqrt{25} = \text{wrong answer}\]
- $50 \div 2 = 25$
  \[x \times x = 25\]
  \[x = \text{wrong answer}\]

Q7.
Award TWO marks for the correct answer of 64

If the answer is incorrect, award ONE mark for evidence of an appropriate method, eg

\[
216 = 6 \times 6 \times 6 \\
6 \div 1.5 = 4 \\
\text{number of cubes} = 4 \times 4 \times 4
\]

OR \[1.5 \times 1.5 \times 1.5 = 3.375\]

\[
\text{number of cubes} = 216 \div 3.375
\]

*Calculation need not be completed for the award of the mark.*

Up to 2

Q8.
Award TWO marks for the correct answer of 5 cm

If the answer is incorrect award ONE mark for evidence of an appropriate method, eg

\[
2n \times n \times n = 250
\]

so

\[
n \times n \times n = 125
\]

*The calculation need not be completed for the award of the mark, but $n \times n \times n = 125$ OR $n^3 = 125$ must be reached.*

Up to 2

Q9.
80

*Measures*

or

Shows or implies a complete correct method, eg:
\[
\begin{align*}
&\frac{1}{2} (10 \times 10.5) - \left( \frac{1}{2} \times 10 \times 5 \right) \\
&\frac{1}{2} (5.5 + 10.5) \times 10 \\
&\frac{1}{2} (10 \times 5.5) + \left( \frac{1}{2} \times 10 \times 5 \right) = 55 + 22.5 \text{ (error)}
\end{align*}
\]

Q10.
(a) Gives three integers other than 2, 2, 6 (in any order) whose product is 24, eg:
- 1, 1, 24
- 1, 24, 1
- 1, 2, 12
- 1, 3, 8
- 1, 4, 6
- 2, 3, 4

! Non-integer(s) used
As this shows understanding of volume, condone provided the three values given have a product of 24
eg, accept
- 1.5, 2, 8

(b) 7

Q11.
Award TWO marks for the correct answer of 720

If the answer is incorrect, award ONE mark for evidence of an appropriate method, e.g.
- \(3 \times 4 \times 6 = 72\)
- \(8 \times 9 \times 11 = 792\)
- \(792 - 72 =\)

Award ONE mark for sight of 792
Answer need not be obtained for the award of ONE mark.
Q12.

or

1728 seen (the volume of the cube/cuboid)

or

Shows or implies a complete correct method, eg:

- $12 \times 12 \times 12 = 1440$ (error)
  
  $1440 = 16 \times 6 \times \text{height}$

  $\text{height} = \frac{1440}{16 \times 6} = 15$

- $12 \times 12 \times 12 \div 16 \div 6$
  
  ! Measures

  See guidance

Q13.

38

[1] [2]