Reasoning and Problem Solving
Step 8: Volume of a Cuboid

Teaching Note:

The formula for volume is l x w x h where l is horizontal, w is diagonal and h is vertical.

National Curriculum Objectives:

Mathematics Year 6: (6M8a) Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm3) and cubic metres (m3), and extending to other units [for example, mm3 and km3]
Mathematics Year 6: (6M7c) Recognise when it is possible to use formulae for the area of shapes

Differentiation:

Questions 1, 4 and 7 (Problem Solving)
Developing Find the pair of cuboids that could be used to make a compound rectilinear shape with a given volume. Same metric measures used within each question; multiples of 2, 3, 5 and 10 only.
Expected Find all the possible pairs of cuboids that could be used to make a compound rectilinear shape with a given volume. Some conversion between metric measures needed (mm to cm or cm to m). Same metric measures used within each question; whole unit measurements.
Greater Depth Find all the possible pairs of cuboids that could be used to make a compound rectilinear shape with a given volume. Some conversions between metric measures needed (mm to m or m to mm); some measurements with 1 decimal place used.

Questions 2, 5 and 8 (Problem Solving)
Developing Find two missing dimensions when given the volume and 2 additional clues. Differentiation as described for question 1.
Expected Find two missing dimensions when given the volume and 2 additional clues. Differentiation as described for question 1.
Greater Depth Find two missing dimensions when given the volume and 2 additional clues. Differentiation as described for question 1.

Questions 3, 6 and 9 (Reasoning)
Developing Explain if a comparison statement about the volume of two cuboids is correct. Differentiation as described for question 1.
Expected Explain if a comparison statement about the volume of two cuboids is correct. Differentiation as described for question 1.
Greater Depth Explain if a comparison statement about the volume of two cuboids is correct. Differentiation as described for question 1.

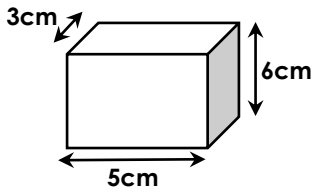
More Perimeter, Area and Volume resources.

Did you like this resource? Don't forget to review it on our website.

© Classroom Secrets Limited 2019

Volume of a Cuboid

1a. Roman is calculating the volume of this cuboid. He says,



I know that 3 x 6 = 18, so the volume is 18 x 5 = 90cm.

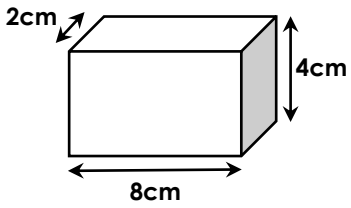
Is Roman correct? Explain why.

D

Not to scale

R

1b. Anya is calculating the volume of this cuboid. She says,



I know that 4cm x 8cm = 24cm^2, so the volume is 24cm^2 x 2cm = 48cm^3.

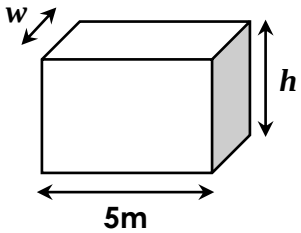
Is Anya correct? Explain why.

D

Not to scale

R

2a. Use the clues to find the missing dimensions of this cuboid.



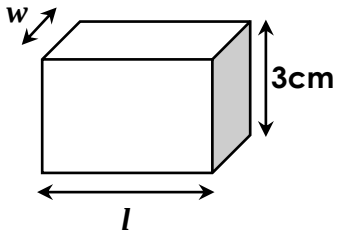
- Its volume is 30m^3.
- The total of the length, width and height is 10m.
- The width is 1m less than the height.

D

Not to scale

PS

2b. Use the clues to find the missing dimensions of this cuboid.



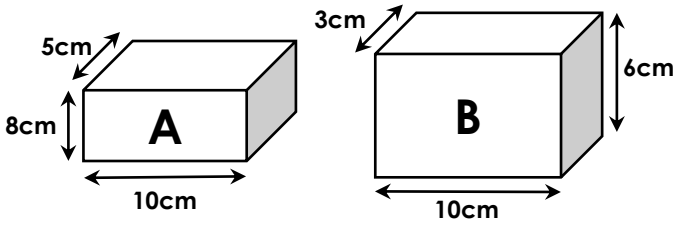
- Its volume is 60cm^3.
- The total of the length, width and height is 15cm.
- The width is one fifth of the length.

D

Not to scale

PS

3a. Olivia is comparing two containers.





Shape B has a larger volume than shape A.

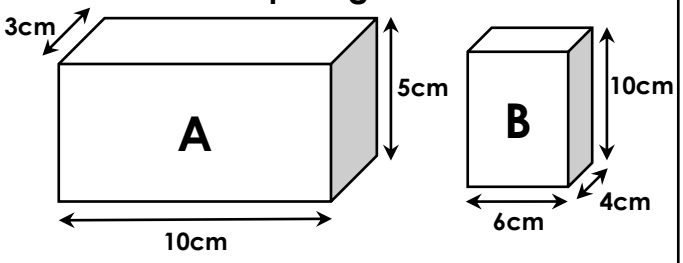
Is she correct? Explain your reasoning.

D

Not to scale

R

3b. Oscar is comparing two containers.





Shape B has a larger volume than shape A.

Is he correct? Explain your reasoning.

D

Not to scale

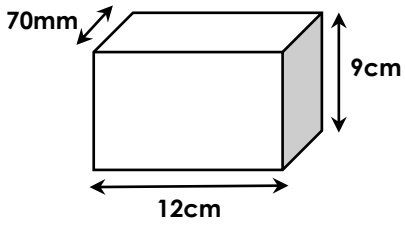
R

© Classroom Secrets Limited 2019

Volume of a Cuboid

Volume of a Cuboid

4a. Harry is calculating the volume of this cuboid. He says,



I know that 12cm x 7cm = 84cm², so the volume is 84cm² x 9cm = 756cm³.

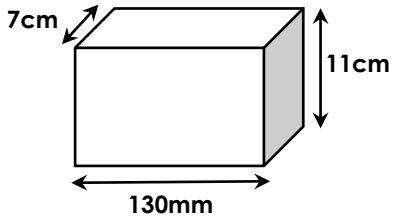
Is Harry correct? Explain why.

E

Not to scale

R

4b. Bella is calculating the volume of this cuboid. She says,



I know that 7cm x 11cm = 77cm², so the volume is 77cm² x 13cm = 1,001cm².

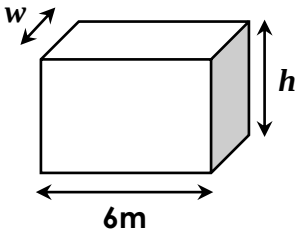
Is Bella correct? Explain why.

E

Not to scale

R

5a. Use the clues to find the missing dimensions of this cuboid.



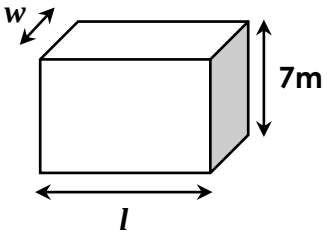
- **Its volume is 720m³.**
- **The total of the length, width and height is 3,200cm.**
- **The width is less than the height.**

E

Not to scale

PS

5b. Use the clues to find the missing dimensions of this cuboid.



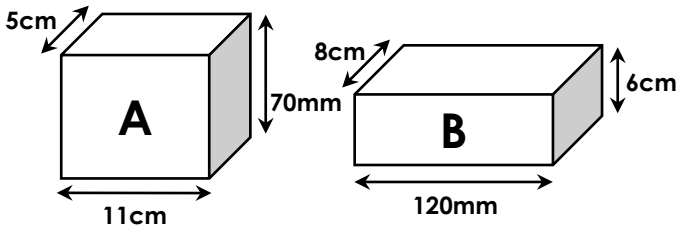
- **Its volume is 420m³.**
- **The total of the length, width and height is 2,400cm.**
- **The width is less than half of the length.**

E

Not to scale

PS

6a. Sarah is comparing two cuboids.





Shape A has a larger volume than shape B.

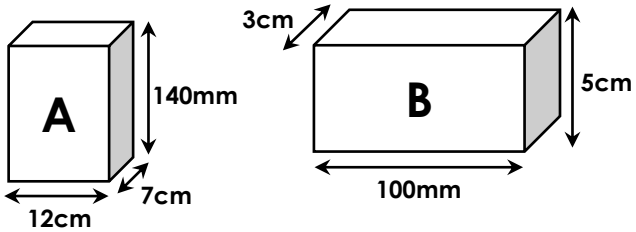
Is she correct? Explain your reasoning.

E

Not to scale

R

6b. Jason is comparing two cuboids.





Shape B has a larger volume than shape A.

Is he correct? Explain your reasoning.

E

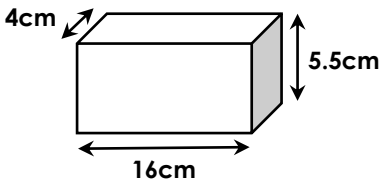
Not to scale

R

© Classroom Secrets Limited 2019

Volume of a Cuboid

7a. Alfie is calculating the volume of this cuboid. He says,



I know that 4cm x 11cm = 44cm², so I can find the volume using 44cm² x 8cm.

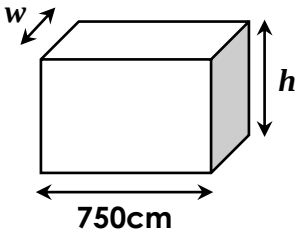
Is Alfie correct? Explain why.

GD

Not to scale

R

8a. Use the clues to find the missing dimensions of this cuboid.



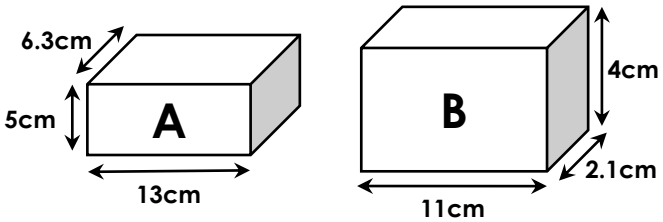
- Its volume is 300m³.
- The total of the length, width and height is 2,150cm.
- The width is smaller than the height.

GD

Not to scale

PS

9a. Lily is comparing two containers.





Shape A has a larger volume than shape B.

Is she correct? Explain your reasoning.

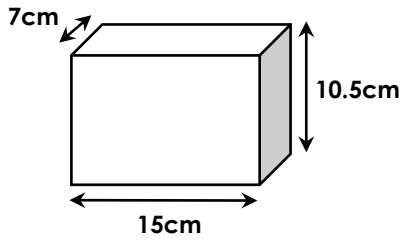
GD

Not to scale

R

Volume of a Cuboid

7b. Leah is calculating the volume of this cuboid. She says,



I know that 7cm x 21cm = 294cm², so I can find the volume using 294cm² x 15cm.

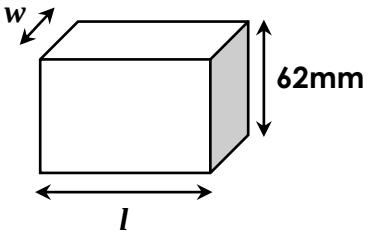
Is Leah correct? Explain why.

GD

Not to scale

R

8b. Use the clues to find the missing dimensions of this cuboid.



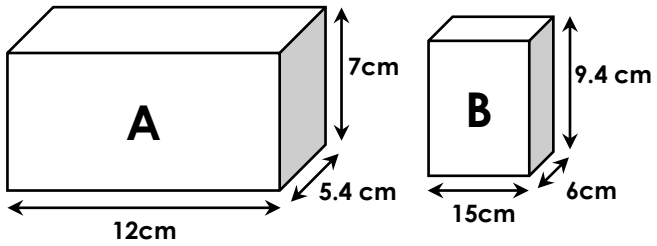
- Its volume is 310cm³.
- The total of the length, width and height is 21.2cm.
- The width is smaller than the length.

GD

Not to scale

PS

9b. Marvin is comparing two containers.





Shape A has a larger volume than shape A.

Is he correct? Explain your reasoning.

GD

Not to scale

R

© Classroom Secrets Limited 2019

Reasoning and Problem Solving
Volume of a Cuboid

Developing

1a. Roman is incorrect. 3cm x 6cm = $18cm^2$. This is then multiplied by 5cm, giving $90cm^3$.

2a. w = 2m, h = 3m

3a. Olivia is not correct because the volume of A is $400cm^3$ and the volume of B is $180cm^3$. Although B looks bigger than A, the shapes are not to scale.

Expected

4a. Harry is correct. He has correctly multiplied the dimensions of the cuboid and included the correct units of measure.

5a. w = 6m, h = 20m

6a. Sarah is incorrect because the volume of A is $385cm^3$ and the volume of B is $576cm^3$.

Greater Depth

7a. Alfie is correct. He has doubled one measurement to make the calculation easier, and halved the remaining measurement to account for this. The correct answer is $352cm^3$.

8a. w = 4m, h = 10m

9a. Lily is correct because the volume of A is $409.5cm^3$ and the volume of B is $92.4cm^3$.

Reasoning and Problem Solving
Volume of a Cuboid

Developing

1b. Anya is incorrect. 4cm x 8cm = $32cm^2$, not $24cm^2$. This is then multiplied by 2, giving $64cm^3$.

2b. l = 10cm, w = 2cm

3b. Oscar is correct because the volume of A is $150cm^3$ and the volume of B is $240cm^3$. Although A looks larger than B, the shapes are not to scale.

Expected

4b. Bella is incorrect. Volume is measured using cubic measurements, not squared measurements. The correct answer is $1{,}001cm^3$.

5b. l = 12cm, w = 5cm

6b. Jason is incorrect because the volume of A is $1{,}176cm^3$ and the volume of B is $150cm^3$.

Greater Depth

7b. Leah is incorrect. She has doubled one measurement to make the calculation easier, but has not halved the remaining calculation to account for this. The correct answer is $1{,}102.5cm^3$.

8b. l = 10cm, w = 5cm

9b. Marvin is not correct because the volume of A is $453.6cm^3$ and the volume of B is $846cm^3$.

© Classroom Secrets Limited 2019