

MATHEMATICS

Stage 5

Measurement and Space

Area and Surface Area

Volume

Teacher: Kyall Duncan

Exam Equivalent Time: 136.5 minutes (based on allocation ~1.25 min/mark)

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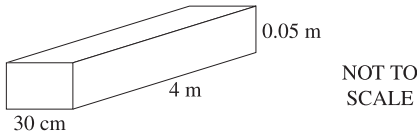
CHRISTIAN COLLEGE

STRENGTH OF PURPOSE

Questions

1. C Volume (002142)

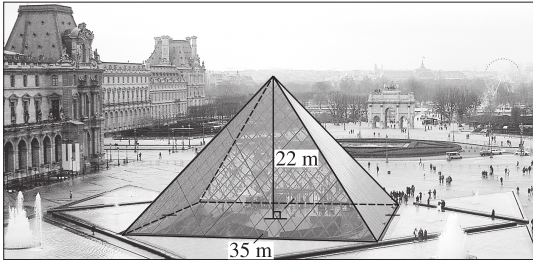
What is the volume of this rectangular prism in cubic centimetres?



- A. 6 cm³
- B. 600 cm³
- C. 60 000 cm³
- D. 6 000 000 cm³

2. C Volume (029073)

The Louvre Pyramid in Paris has a square base with side length 35 m and a perpendicular height of 22 m.

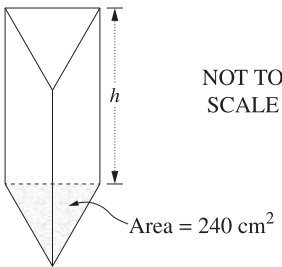


What is the volume of this pyramid, to the nearest m³?

- A. 257 m³
- B. 1027 m³
- C. 8983 m³
- D. 26 950 m³

3. B+ Volume (060327)

A container is in the shape of a triangular prism which has a capacity of 12 litres. The area of the base is 240 cm².

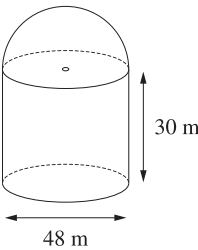


What is the distance, *h*, between the two triangular ends of the container?

- A. 5 cm
- B. 20 cm
- C. 25 cm
- D. 50 cm

4. **B+** Area and Surface Area (010181)

A grain silo is made up of a cylinder with a hemisphere (half a sphere) on top. The outside of the silo is to be painted.

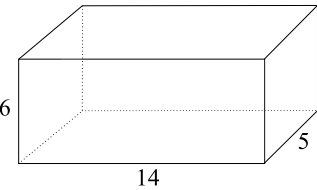


What is the area to be painted?

- A. 8143 m²
- B. 11 762 m²
- C. 12 667 m²
- D. 23 524 m²

5. **E** Area and Surface Area (245991)

Find the surface area of the rectangular prism pictured below. All measurements are in metres. (2 marks)



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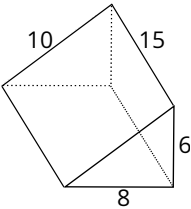
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6. **D** Area and Surface Area (245997)

A triangular prism has the following dimensions (all measurements are in centimetres).



i. Draw a net for this solid. (1 mark)

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ii. Find the surface area of the prism. (2 marks)

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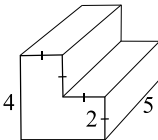
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7. **D** Area and Surface Area (246012)

Find the surface area of the solid below where all measurements are in metres. (2 marks)



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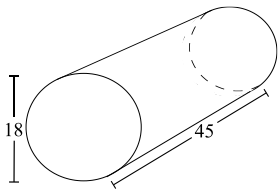
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8. **D** Volume (247440)

The cylinder shown below has a diameter of 18 centimetres and a length of 45 centimetres.



Find the volume of the cylinder, giving your answer to the nearest cubic centimetre. (2 marks)

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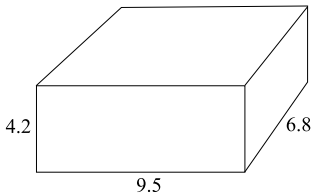
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9. **D** Volume (247252)

A jewellery box in the shape of a rectangular prism is pictured below with all measurements in centimetres.



Find the volume of the jewellery box, giving your answer correct to the nearest cubic centimetre. (2 marks)

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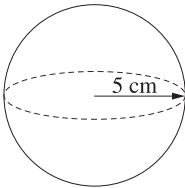
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10. **C** Area and Surface Area (060377)

Calculate the surface area of a sphere with a radius of 5 cm, correct to the nearest whole number. (1 mark)



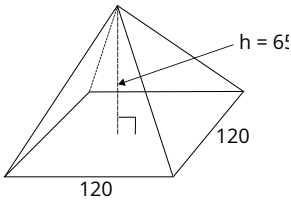
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11. **C** Volume (247456)

The square pyramid below, has a side measurement of 120 metres and a perpendicular height (h) of 65 metres.



Find the volume of the pyramid in cubic metres. (2 marks)

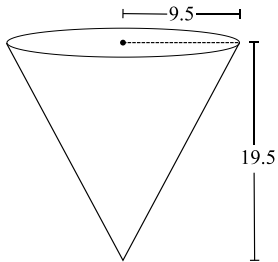
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12. **c** Volume (247473)

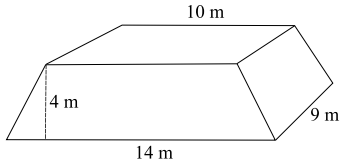
A funnel is made in the shape of a square cone with radius 9.5 centimetres and height 19.5 centimetres.



Find the volume of the funnel in cubic centimetres, giving your answer correct to 2 decimal places. (2 marks)

13. **c** Volume (247256)

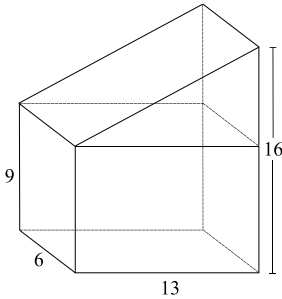
An ancient temple, modelled below, was constructed as a trapezoidal prism.



Find the volume of the temple in cubic metres. (2 marks)

14. **c** Volume (247452)

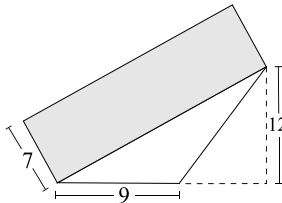
The solid below is made from joining a rectangular prism to a triangular prism, with all measurements in centimetres.



Find the volume of the solid, giving your answer to the nearest cubic centimetre. (3 marks)

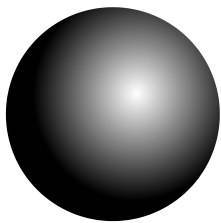
15. **c** Volume (247434)

The solid below is a triangular prism. All measurements are in centimetres.



Find the volume of the solid, in cubic centimetres. (2 marks)

16. **c** Volume (247175)



A cannon ball is made out of steel and has a diameter of 23 cm.
Find the volume of the sphere in cubic centimetres (correct to 1 decimal place). *(2 marks)*

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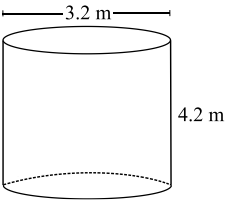
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17. **c** Area and Surface Area (246181)

Calculate the surface area of the cylinder below, giving your answer correct to two decimal places. *(2 marks)*



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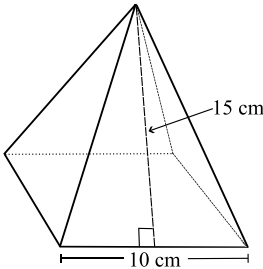
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18. **c** Area and Surface Area (246349)

A square pyramid with a slant height of 15 centimetres is pictured below.



Find the total surface area of the pyramid, including its base. *(2 marks)*

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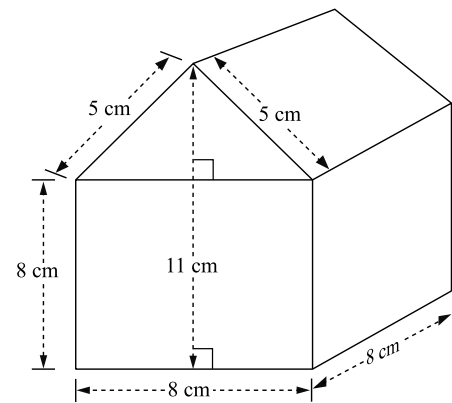
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19. **C** Area and Surface Area (157659)

A composite solid consists of a triangular prism which fits exactly on top of a cube, as shown.



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Find the surface area of the composite solid. (3 marks)

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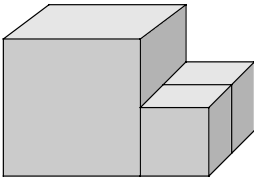
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20. **B** Area and Surface Area (246057)

A cube has a side length of 6 cm.

Two smaller cubes of side length 3 cm are attached to the larger cube as shown in the diagram below.



What is the surface area of the new object? (3 marks)

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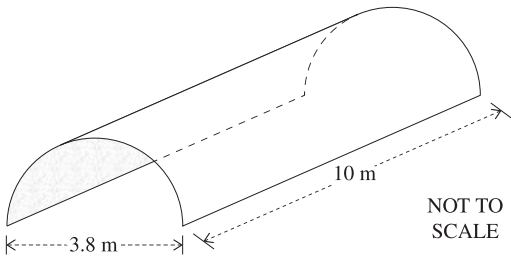
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21. **B** Area and Surface Area (118400)

A shade shelter is to be constructed in the shape of half a cylinder with open ends. The diameter is 3.8 m and the length is 10 m.



The curved roof is to be made of plastic sheeting.

What area of plastic sheeting is required, to the nearest m²? (2 marks)

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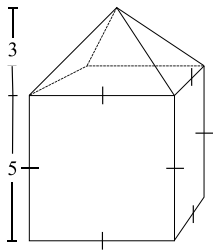
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22. **B** Volume (247465)

The storage building below is constructed by joining a square pyramid to a cube, with all measurements in metres.



Find the volume of the solid in cubic metres. (3 marks)

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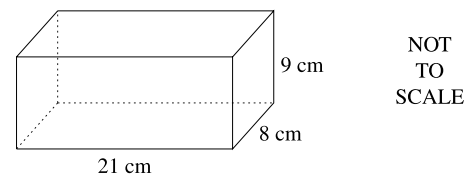
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23. **B** Volume (026191)

A clay brick is made in the shape of a rectangular prism with dimensions as shown.

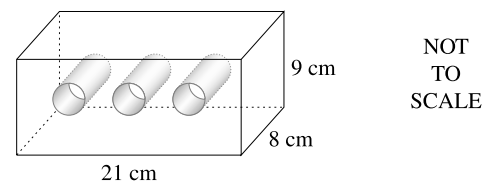


i. Calculate the volume of the clay brick. (1 mark)

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Three identical cylindrical holes are made through the brick as shown. Each hole has a radius of 1.4 cm.



ii. What is the volume of clay remaining in the brick after the holes have been made? (Give your answer to the nearest cubic centimetre.) (3 marks)

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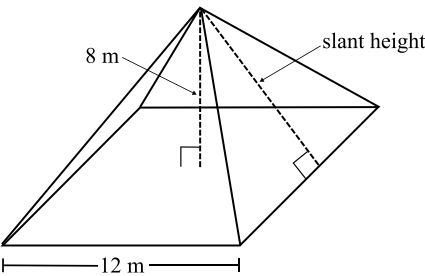
iii. What percentage of clay is removed by making the holes through the brick? (Give your answer correct to one decimal place.) (1 mark)

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24. **B** Area and Surface Area (246337)

A square pyramid with a perpendicular height of 8 metres is pictured below.



i. Using Pythagoras, calculate the slant height of the pyramid. (2 marks)

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ii. Find the total surface area of the pyramid, including its base, to the nearest square metre. (2 marks)

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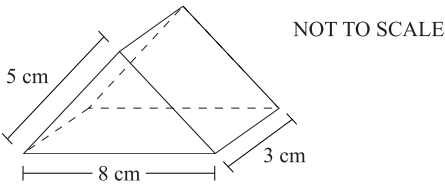
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25. **B** Area and Surface Area (246092)

Clancy needs to paint all sides of a triangular prism.
The area of each triangular face is 12 cm^2 .



What is the total area Clancy needs to paint? (2 marks)

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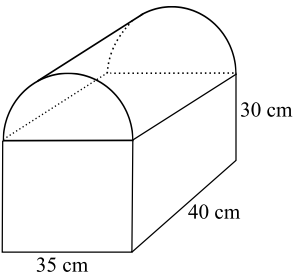
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26. **B** Area and Surface Area (246199)

A letterbox, which has been constructed by joining a half cylinder and rectangular prism, needs to be painted on each external surface.



Find the surface area of the letterbox, giving your answer correct to the nearest square centimetre. (3 marks)

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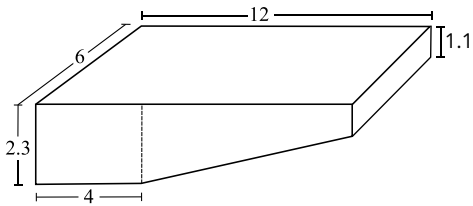
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27. **B+** Volume (246665)

Calculate the volume of earth that must be excavated so that the pool shell below fits exactly into the hole. All measurements are in metres. *(3 marks)*



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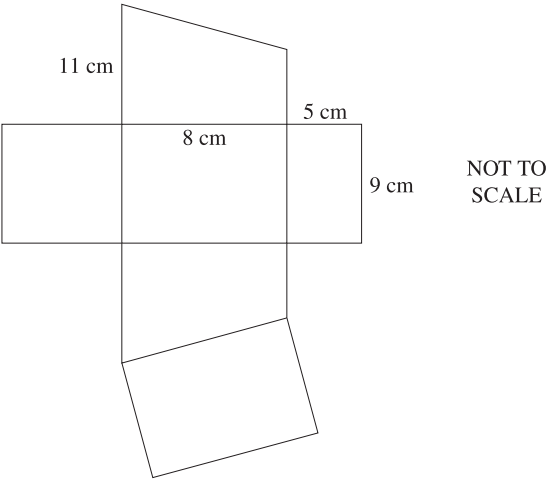
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28. **B+** Volume (246626)

A net is made using four rectangles and two trapeziums. It is folded to form a solid.



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What is the volume of the solid, in cm^3 ? *(3 marks)*

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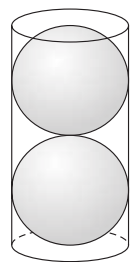
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29. **B+** Volume (247079)

Two identical spheres fit exactly inside a cylindrical container, as shown.



The diameter of each sphere is 12 cm.
What is the volume of the cylindrical container, to the nearest cubic centimetre? *(3 marks)*

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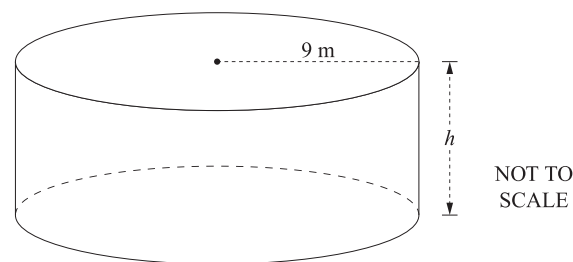
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30. **B+** Volume (118521)

A cylindrical water tank has a radius of 9 metres and a capacity of 1.26 megalitres.



What is the height of the water tank? Give your answer in metres, correct to two decimal places. *(3 marks)*

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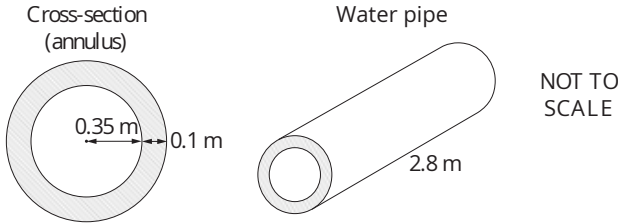
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31. **A** Volume (247101)

A concrete water pipe is manufactured in the shape of an annular cylinder. The dimensions are shown in the diagrams.



Find the approximate volume of concrete needed to make the water pipe, giving your answer in cubic metres correct to two decimal places. (3 marks)

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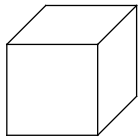
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32. **A** Area and Surface Area (246160)

The total surface area of a cube is 150 cm².



How long is an edge of the cube? (2 marks)

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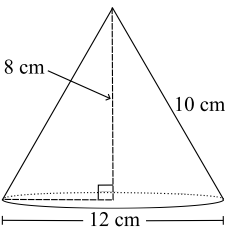
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33. **A** Area and Surface Area (246356)

A right cone with perpendicular height of 8 cm, slant height of 10 cm and a base diameter of 12 cm is pictured below.



Find the total surface area of the cone, including its base, correct to two decimal places. (3 marks)

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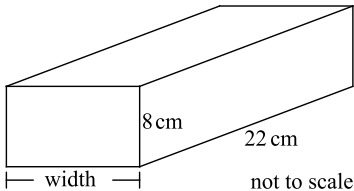
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34. **A** Area and Surface Area (246166)

The surface area of a brick is given by the rule:

total surface area = $2 \times [(width \times height) + (width \times length) + (height \times length)]$

The brick shown has a total surface area of 982 square centimetres.



What is the width of the brick? (2 marks)

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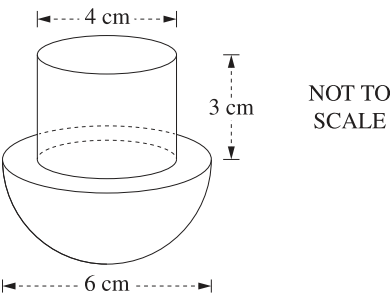
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35. **A** Area and Surface Area (195581)

A composite solid is shown. The top section is a cylinder with a height of 3 cm and a diameter of 4 cm. The bottom section is a hemisphere with a diameter of 6 cm. The cylinder is centred on the flat surface of the hemisphere.



Find the total surface area of the composite solid in cm^2 , correct to 1 decimal place. (4 marks)

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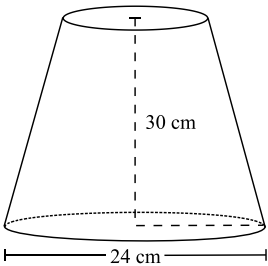
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36. **A** Volume (247488)

The truncated cone, pictured below, is made by cutting a right cone of height 60 centimetres.



Find the volume of the truncated cone, giving your answer to the nearest cubic centimetre. (4 marks)

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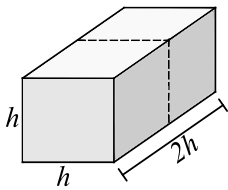
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37. **A+** Area and Surface Area (246153)

The rectangular prism, shown below, is cut in half to form 2 equal cubes.



What is the ratio of the surface area of the rectangular prism to one of the cubes? *(3 marks)*

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