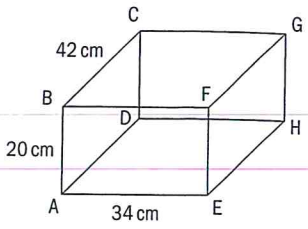
Review exercise Sections 6.6 & 6.7

Paper 1 style questions

EXAM-STYLE QUESTIONS

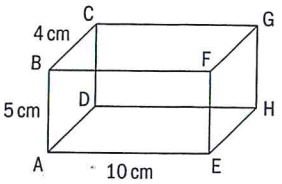
1 The cuboid ABCDEFGH is shown in the diagram.
AB = 20 cm, BC = 42 cm and AE = 34 cm.



a Calculate the surface area of the cuboid.

b Calculate the volume of the cuboid, giving your answer in dm^3.

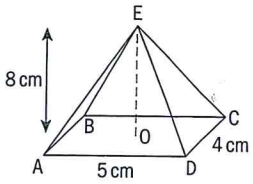
2 The cuboid ABCDEFGH is shown in the diagram.
AB = 5 cm, BC = 4 cm and AE = 10 cm.



a Calculate the length of AH.

b Calculate the angle that AG makes with the face ADHE.

3 The diagram shows a rectangular-based right pyramid ABCDE. The height of the pyramid is 8 cm. The base is 5 cm long and 4 cm wide.
Calculate

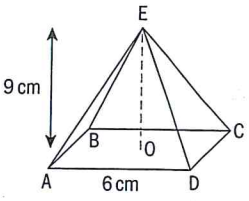


a the length of AC

b the length of EC

c the angle AEC.

4 The diagram shows a square-based right pyramid ABCDE. The height of the pyramid is 9 cm. Each edge of the base is 6 cm.
Calculate

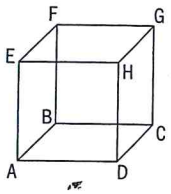


a the distance between the midpoint of DC and E

b the area of triangle DCE

c the surface area of the pyramid.

5 The diagram shows a hollow cube ABCDEFGH. Its volume is $512\ cm^3$.



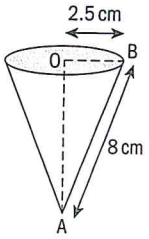
a Write down the length of any edge of the cube.

b Find the distance AC.

Rosaura puts a pencil in the cube. The pencil is 13.5 cm long.

c Does the pencil fit in the cube? Justify your decision.

6 A cone has the dimensions shown in the diagram.
Point B is on the circumference of the base, point O is the center of the base and point A is the apex of the cone.



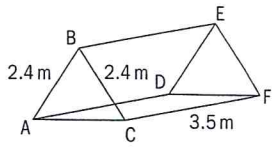
a Calculate the size of the angle that AB makes with the base of the cone.

b **i** Calculate the height of the cone.

ii Calculate the volume of the cone.

EXAM-STYLE QUESTION

7 The diagram represents a tent in the shape of a prism. The front of the tent, ABC, is an isosceles triangle with AB = BC = 2.4 m and $A\hat{B}C = 110°$. The tent is 3.5 m long.



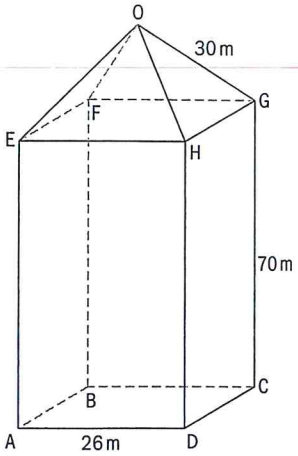
a Calculate the area of the front face of the tent ABC.

b Calculate the space inside the tent.

Paper 2 style questions

EXAM-STYLE QUESTIONS

1 An office tower is shown in the diagram. It consists of a cuboid with a square base and a square-based right pyramid.



a Calculate the distance from O to M, the midpoint of HG.

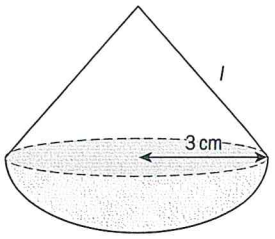
b Calculate the height of the tower.

c Find the angle that OM makes with the plane EFGH.

A cleaning services company charges US$ 78 per m^2 to clean the outside of a building.

d Calculate the cost of cleaning the tower, giving your answer correct to the nearest US$.

2 A solid sculpture consist of a hemisphere of radius 3 cm and a right circular cone of slant height l as shown in the diagram.



a Show that the volume of the hemisphere is $18\pi cm^3$.

The volume of the hemisphere is two-thirds that of the cone.

b Find the vertical height of the cone.

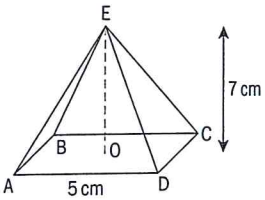
c Calculate the slant height of the cone.

d Calculate the angle between the slanting side of the cone and the flat face of the hemisphere.

The sculpture is made of a material that weighs 10.8 g per cm^3.

e Calculate the weight of the sculpture, giving your answer in kg.

3 ABCDE is a solid glass right pyramid. The base of the pyramid is a square of side 5 cm and center O. The vertical height is 7 cm.



a Calculate the volume of the pyramid.

The glass weighs 8.7 grams per cm^3.

b Calculate the weight of the pyramid, giving your answer correct to the nearest g.

c Find the length of a sloping edge of the pyramid, giving your answer correct to 4 significant figures.

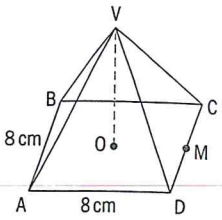
d Calculate the angle made between the edge ED and the base of the pyramid.

e Calculate the size of the angle AED.

f Calculate the total surface area of the pyramid.

EXAM-STYLE QUESTION

4 The diagram shows a square-based right pyramid ABCDV. The midpoint of DC is M and VM is inclined at 65° to the base. The sides of the base are 8 cm and O is the center of the base.



a Find the height of the pyramid, giving your answer correct to 3 significant figures.

b Calculate

i the length of VM

ii the size of angle DVC.

c Find the total surface area of the pyramid.

d Find the volume of the pyramid, giving your answer correct to the nearest cm^3.

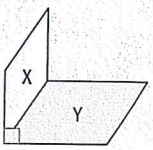
e If you have a cone with the same volume and a diameter of 8cm, find its height.

Summary

Geometry of three-dimensional solids

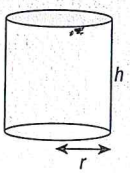
- In a **right prism** the end faces are the same shape and size and are parallel. All the other faces are rectangles that are **perpendicular** to the end faces.
- If you cut parallel to the end face of a right prism the **cross-section** will always be the same shape and size.
- The base of a **pyramid** is a polygon. The other faces are triangles that meet at a Point called the **apex**. In a **right pyramid** the apex is vertically above the center of the base.

Angles between two lines, or between a line and a plane

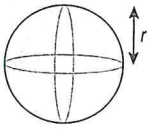


- When two faces of a solid, X and Y, are perpendicular, any line in face X is perpendicular to any line in face Y.

Surface areas of three-dimensional solids



- The **surface area** of a solid is the sum of the areas of all its faces. Surface area is measured in square units, e.g. cm^2, m^2.
- Area of curved surface of a cylinder = $2\pi rh$
  Total surface area of a cylinder = $2\pi rh + 2\pi r^2$
- Surface area of a sphere = $4\pi r^2$



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