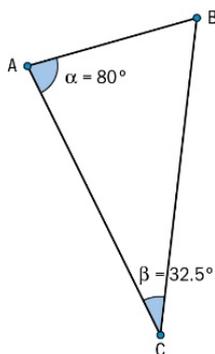


2 Representing space: non-right angled trigonometry and volumes

- 1 The diameter of the Moon is 3,474 km.
 - a Find the circumference of the Moon. Assume that the Moon is a perfect sphere.
Give your answer correct to 2 dp.
 - b Write down your answer in part a correct to the nearest hundred.
 - c Write down your answer to part b in the form $a \times 10^k$, where $1 \leq a < 10$, where k is an integer.
- 2 Tomi is making a right-angled triangular table to place in one of the corners of his room. The three sides of a triangle have lengths of 16 cm, 19 cm, and 30 m.
 - a Show that this triangle is not right-angled.
 - b Determine how to correct one of the sides so that the table becomes a right-angled one.
- 3 An arc of a circle with radius 8 cm has a central angle 22° .
 - a Find the length of the arc.
 - b Find the area of the sector with central angle 22° .
- 4 Bambi has a triangular orchard, ABC. The length of side AB is 124.5 m, and the length of side BC is 230.8 m. The angle between side AB and side BC is 128° . Find the area of Bambi's orchard.
 - a Give your answer correct to the nearest integer.
 - b Give your answer correct to 1dp.
- 5 A triangular plot ABC, shown in the diagram below, has angle $A = 80^\circ$, angle $C = 32.5^\circ$, and side $BC = 325$ m.



- a Find the length of AB.
- b Find the size of angle B.
- c Find the length of AB.
- d Find the length of fencing, in m, necessary to fence the triangular plot.

- 6** A box, designed to be used as a juice container, has dimensions 4 cm, 5 cm, and 7 cm.

a Find the volume of the cone.

The juice container is expected to hold 120 cm^3 of juice, but a sample container is found to hold only 110 cm^3 .

b Determine the percentage error

- 7** A petroleum tank is in the form of a cylinder with radius 5 meters. The volume of the tank is 700 m^3 . Find:

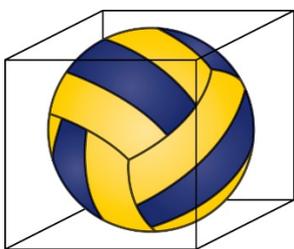
a the height, h , of the cylinder.

b the total surface area of the tank.

To reduce air pollution, petroleum tanks must be painted with white paint.

c Find the amount of paint necessary to cover the surface of the entire tank, if 1 L of paint covers 11 m^2 . Use that $1 \text{ L} = 0.001 \text{ m}^3$.

8

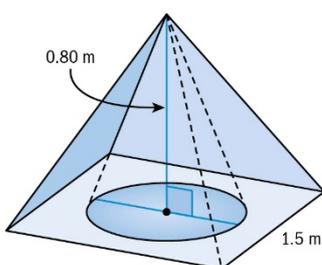


The Ultimate Volleyball factory produces volleyball balls with radius 21 cm. Each ball is tightly packed in a box so that it touches each side of the box. To protect the ball, the box is filled with foam.

a Find the volume of the box.

b Find the amount of foam needed to fill the box.

9



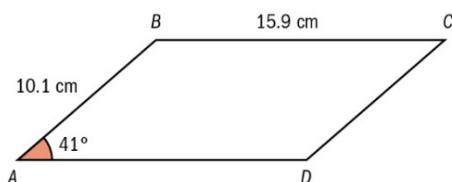
A regular rectangular pyramid with a base side 1.5 m is made of a transparent acrylic material with volume 1.6 m^3 . It is to be used by a museum to exhibit a piece. A cone, with a radius of 0.80 m and height and apex the same as the pyramid, is carved out to make space for the exhibition piece.

a Show that the maximum height of the museum piece that can be encased by the pyramid is 2.1 m, correct to 1 dp;

b Determine the volume of the acrylic material that has not been removed from the pyramid.

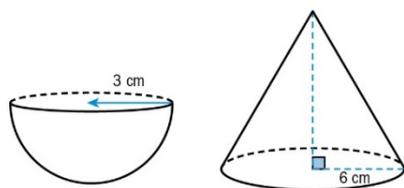
Exam-style questions

10 The diagram shows a parallelogram $ABCD$.



- a** Find the length of AC . (4)
b Find the angle that the line AC makes with the line AD . (3)
c Find the area of the parallelogram. (2)

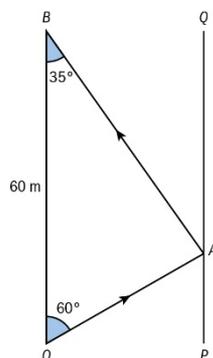
11



A hemisphere has radius 3 cm , and a cone has radius 6 cm .

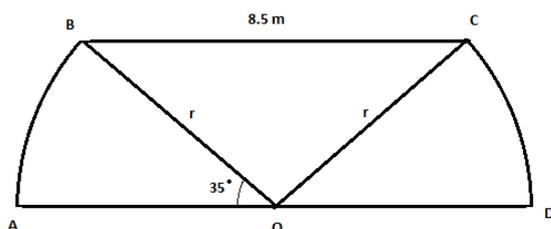
Given that the volume of the hemisphere is twice the volume of the cone, show that the curved surface area of the cone is equal to $\frac{9\pi\sqrt{65}}{2} \text{ cm}^2$. (9)

12



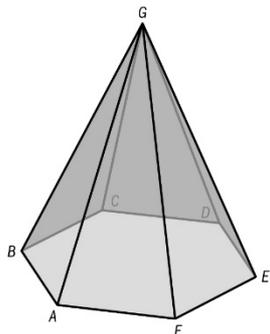
OB and PQ are two sides of a long straight road. Sarah crosses the road from O to A to visit a friend, then crosses back from A to B . She finishes on the same side of the road as she started on, but is 60 m further along. Find the width of the road. (7)

13 A paving slab consists of three composite parts: two identical sectorial areas and one isosceles triangle, as shown in the diagram.



Find the total area of the paving slab. (7)

- 14** The following diagram shows a hexagonal pyramid, where the base is regular and vertex G is directly above the centre of the base. Length $AB = 6$ cm, and the perpendicular height of the pyramid is 10 cm.



- a** State the number of
- i** faces
 - ii** vertices
 - iii** edges. (3)
- b** Find the volume of the pyramid. (5)
- c** Find the total surface area of the pyramid. (7)
- d** Determine the angle between face AFG and the base of the pyramid. (4)