

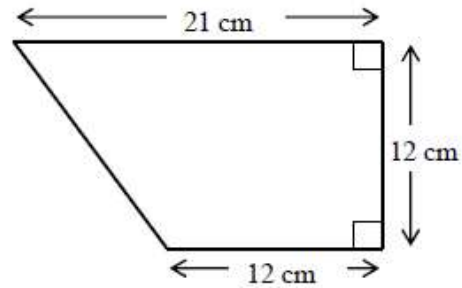


**Maths
Junior Certificate
Higher Level**

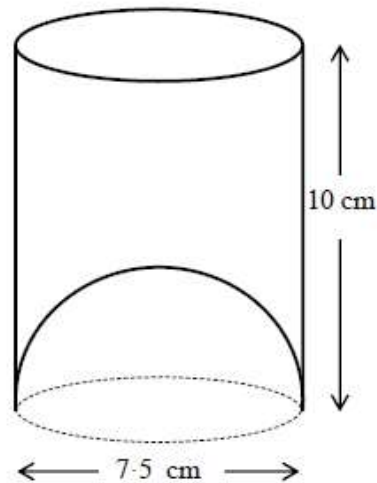
**Past Exam Questions on
Volume (Cones, Cylinders & Spheres)**

Q1 Part (a) 2012 Paper 2

1. (a) ✍ Find the perimeter of the shape shown in the diagram.



- (b) A drinking glass is in the shape of a cylinder of diameter 7.5 cm and of height 10 cm. It has a hemispherical base as shown in the diagram.



- (i) ✍ Calculate the curved surface area of the cylindrical part of the glass, correct to two decimal places.
- (ii) ✍ Calculate the total surface area of the glass correct to two decimal places.

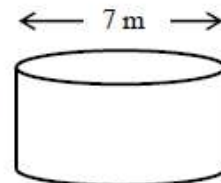
- (c) A large building has a flat roof of length 50 m and of width 40 m. On average there are 5 mm of rainfall on the roof in a week.



- (i) ✍ Calculate the average volume of rain that will fall on the roof in a week. Give your answer in m^3 .

The rain is harvested in a cylindrical tank of diameter 7 m.

- (ii) ✍ Calculate the average rise in the level of the water in the tank in a week.



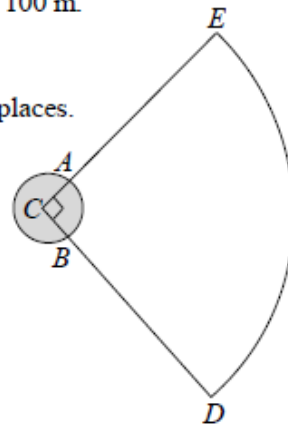
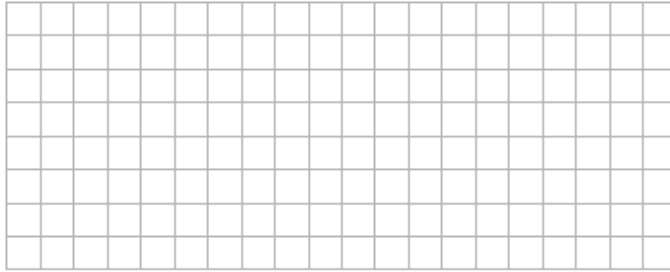
Give your answer in metres correct to two decimal places.

The tank is emptied when the water reaches a height of 3.38 m.

- (iii) ✍ How many times a year, on average, will the tank be emptied?

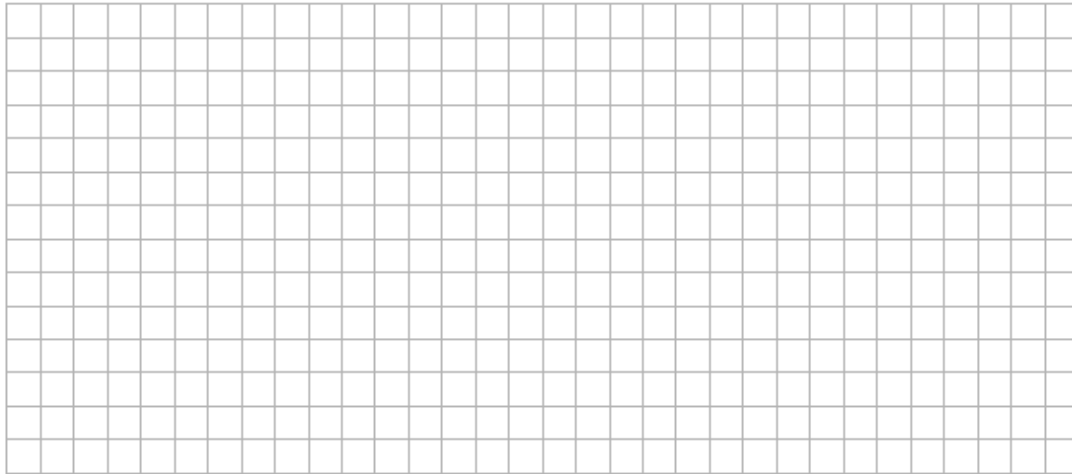
- (c) The diagram, not to scale, represents a shot-put zone in an athletics stadium. The area of CDE is a quarter of the area of a disc of centre C and of radius 100 m.

- (i) ✎ Calculate the area of CDE , correct to two decimal places.



The shot-put zone consists of a throwing zone and a landing zone. The throwing zone (shaded) is a disc of centre C and of radius 1 m.

- (ii) ✎ Calculate the area of the throwing zone, correct to two decimal places.



The landing zone is the unshaded area $ABDE$, which is part of CDE .

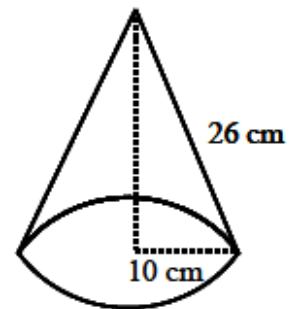
- (iii) ✎ Calculate the total area of the shot-put zone, correct to two decimal places.



Q1 Part (b) 2010 Paper 2

- (b) A cone has a slant height of 26 cm and a radius of 10 cm.

- (i) ✎ Find the curved surface area of the cone, in terms of π .

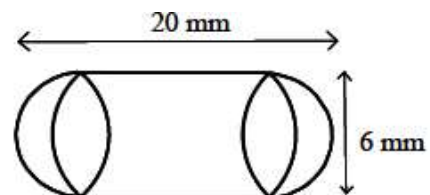


The curved surface area of the cone is doubled, while the slant height remains the same.

- (ii) ✎ Find the radius and hence the vertical height of this cone, correct to the nearest cm.
- (iii) ✎ Show that the volume of this cone is more than double the volume of the cone part (i).

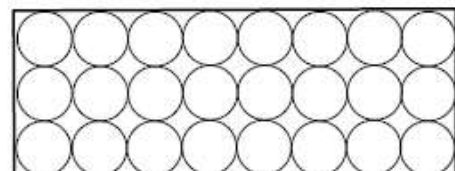
Q1 Part (c) 2010 Paper 2

- (c) A vitamin capsule is in the shape of a cylinder with hemispherical ends. The length of the capsule is 20 mm and the diameter is 6 mm.



- (i) ✎ Calculate the volume of the capsule, giving your answer correct to the nearest mm^3 .

A course of these vitamins consists of 24 capsules. The capsules are stacked in three rows of eight in a box as shown in the diagram.



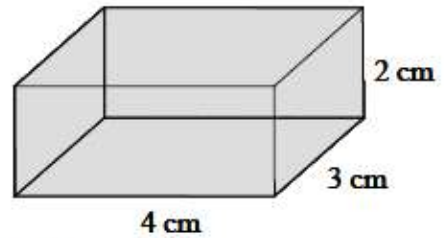
- (ii) ✎ How much of the internal volume of the box is not occupied by the capsules.

Q1 Part (a) 2009 Paper 2

1. (a) ✍ Find the total surface area of a solid hemisphere of diameter 14 cm.
Give your answer correct to the nearest whole number.

Q1 Part (b) 2009 Paper 2

- (b) A jeweller buys a rectangular block of gold of length 4 cm, width 3 cm and height 2 cm. 1 cm³ of gold costs €400.



- (i) ✍ Calculate the cost of the block of gold.

The jeweller needs 250 mm³ of gold to make a gold ring.

- (ii) ✍ How many rings can be made from the block?



Each ring is sold for €120.

- (iii) ✍ Calculate the amount of profit the jeweller makes on each ring.

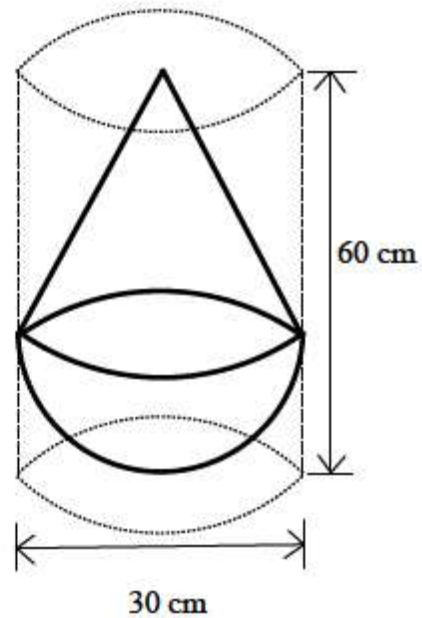
Q1 Part (c) 2009 Paper 2

- (c) A float in the shape of a cone on top of a hemisphere is made from solid rubber. The diameter of the hemisphere is 30 cm and the height of the float is 60 cm.

- (i) ✎ Find the volume of the float in terms of π .

The float is cut from a solid rubber cylinder of diameter 30 cm and height 60 cm.

- (ii) ✎ Express the volume of rubber used in the float as a percentage of the volume of the cylinder. Give your answer correct to the nearest whole number.



Q1 Part (a) 2008 Paper 2

1. (a) The height and the diameter of a solid cylinder are both 8 cm in length.
- ✎ Find the curved surface area of the cylinder correct to the nearest whole number.

Q1 Part (c) 2008 Paper 2

(c) A spherical golf ball has a diameter of 4 cm.

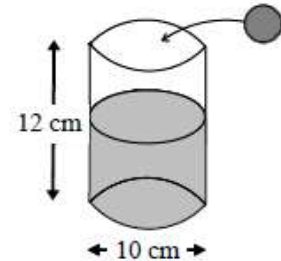
(i) ✎ Find the volume of the golf ball in terms of π .

A cylindrical hole on a golf course is 10 cm in diameter and 12 cm deep. The hole is half full of water.

(ii) ✎ Calculate the volume of water in the hole, in terms of π .

The golf ball is dropped into the hole.

(iii) ✎ Find the rise in the level of the water, correct to two decimal places.

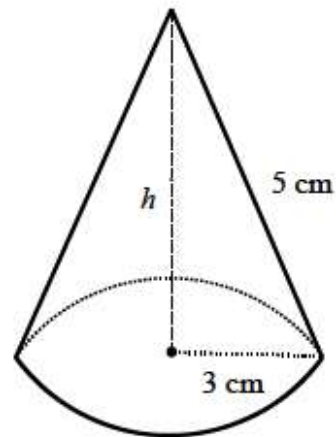


Q1 Part (a) 2007 Paper 2

1. (a) A cone has a base radius of 3 cm and a slant height of 5 cm.

(i) ✎ Find h , the perpendicular height of the cone.

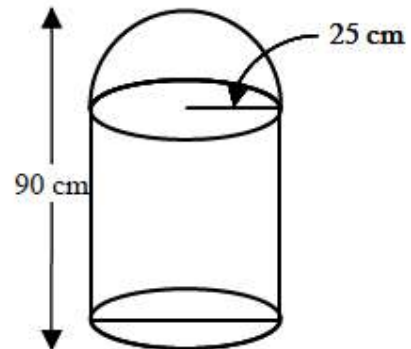
(ii) ✎ Find the volume of the cone in terms of π .



Q1 Part (b) 2007 Paper 2

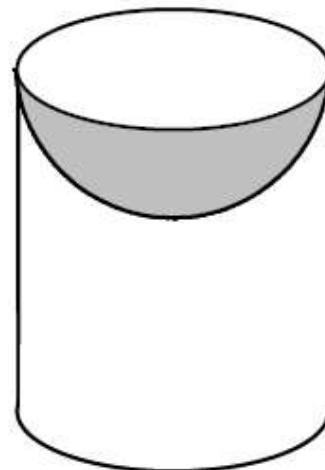
- (b) A hot water container is in the shape of a hemisphere on top of a cylinder as shown. The hemisphere has a radius of 25 cm and the container has a height of 90 cm.

- ✍ Find the internal volume of the container in litres, giving your answer correct to the nearest litre.



Q1 Part (b) 2005 Paper 2

- (b) (i) A solid metal cylinder has height 20 cm and diameter 14 cm.
✍ Find its curved surface area in terms of π .
- (ii) A hemisphere with diameter 14 cm is removed from the top of this cylinder, as shown.
✍ Find the total surface area of the remaining solid in terms of π .



Q1 Part (c) 2005 Paper 2

- (c) (i) A cone has radius x and height $3x$.
✍ Find its volume in term of π and x .
- (ii) A second cone has twice the radius and half the height of the first cone.
✍ Find the ratio of the volume of the second cone to the volume of the first.