MATHEMATICAL SKILLS

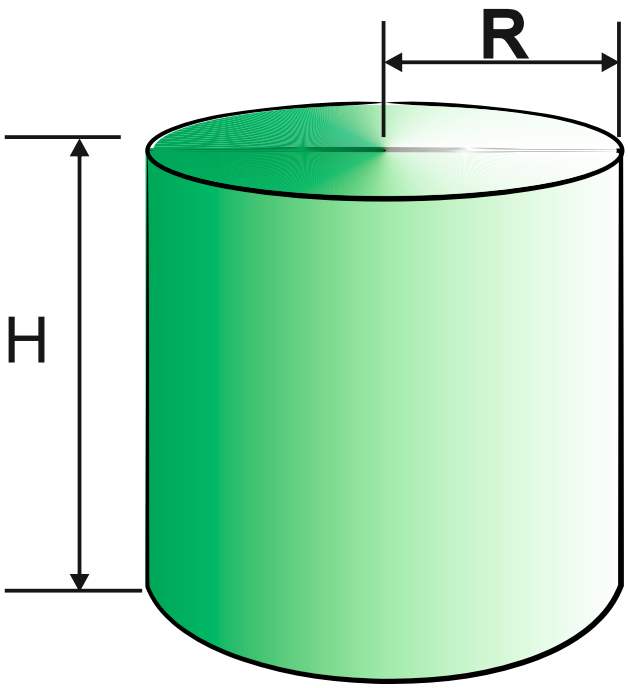
VOLUME OF A CYLINDER AND ASSOCIATED GEOMETRICAL SHAPES

DESIGN AND TECHNOLOGY

WORLD ASSOCIATION OF TECHNOLOGY TEACHERS https://www.facebook.com/groups/254963448192823/ www.technologystudent.com © 2017 V.Ryan © 2017

HOW TO CALCULATE THE VOLUME OF A CYLINDER

DEFINITION: A three dimensional geometrical shape, that has a circle at each end of a single curved surface.

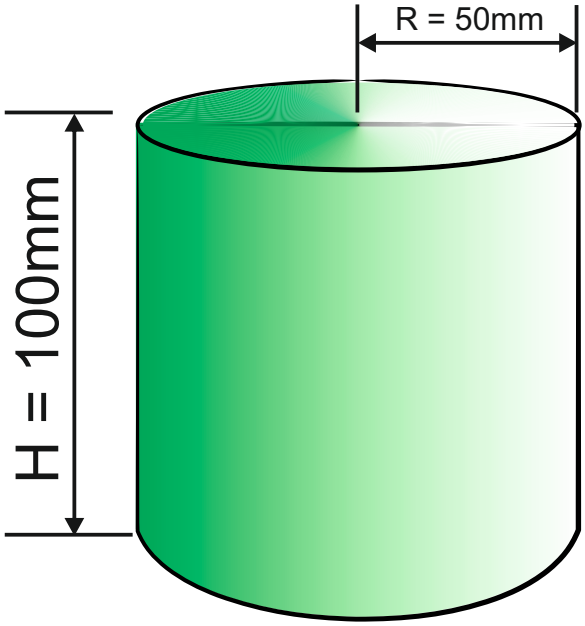


In order to calculate the volume of a cylinder, the height and radius of the circular top /bottom must be known. The following formula is used to calculate the volume.

$$v = \pi r^2 h$$

volume = pi x radius² x height

$$\pi \text{ (pi)} = 3.14$$



$$v = \pi r^2 h$$

volume = 3.14 x 50mm x 50mm x 100mm

volume = 785000mm³

or

volume = 785cm³

QUESTIONS - VOLUME OF A CYLINDER

Calculate the volume of the cylinders seen below.

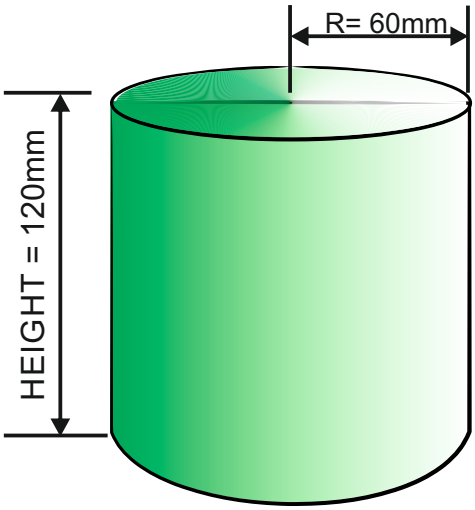
For the purpose of these calculations
π (pi) = 3.14

FORMULA

$v = \pi r^2 h$

volume = pi x radius² x height

π (pi) = 3.14



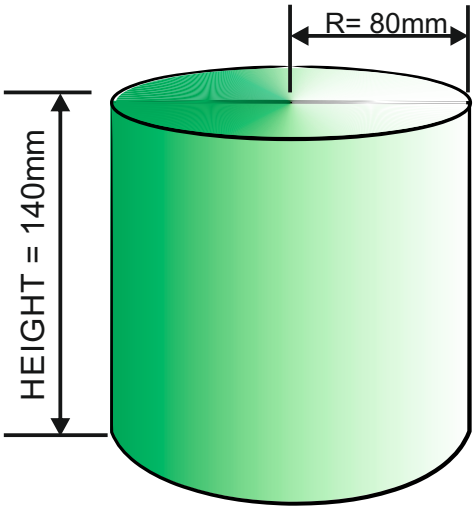
$v = \pi r^2 h$

volume = 3.14 x 60mm x 60mm x 120mm

volume = 1356480mm³

or

volume = 1356.480cm³



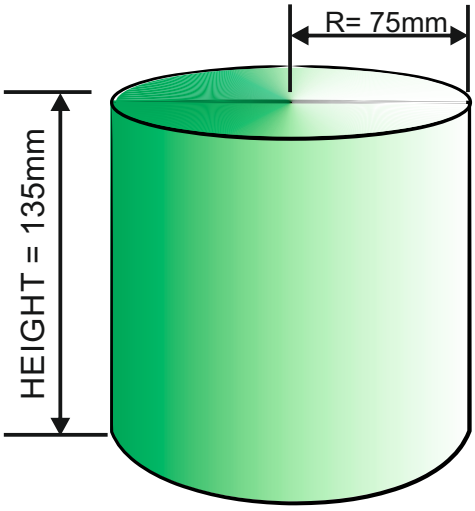
$v = \pi r^2 h$

volume = 3.14 x 80mm x 80mm x 140mm

volume = 2813440mm³

or

volume = 2813.440cm³



$v = \pi r^2 h$

volume = 3.14 x 75mm x 75mm x 135mm

volume = 2384437.5mm³

or

volume = 2384.437cm³

QUESTIONS - VOLUME OF A CYLINDER

Calculate the volume of the cylinders seen below.

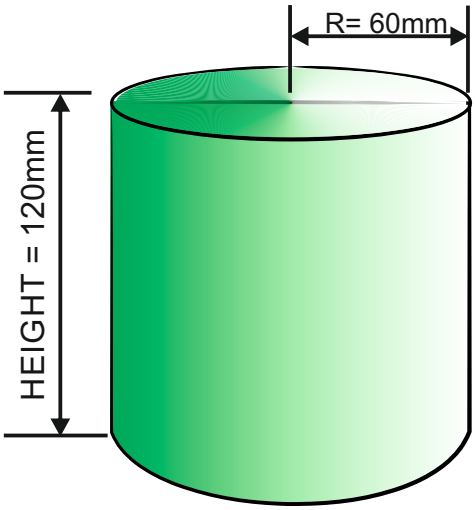
For the purpose of these calculations
π (pi) = 3.14

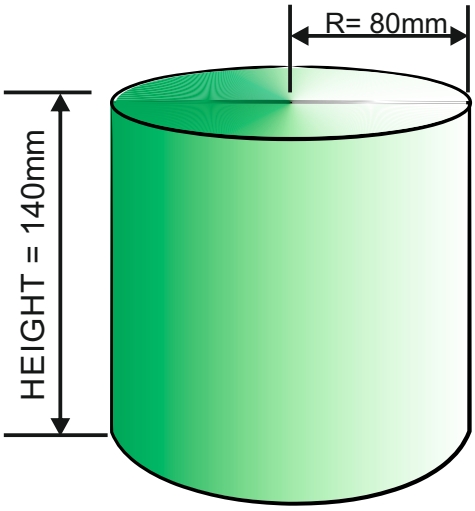
FORMULA

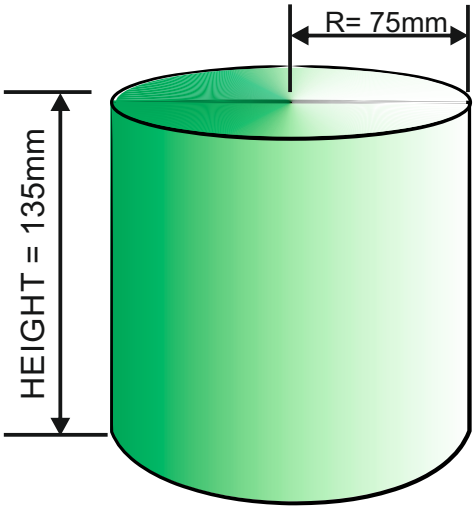
$v = \pi r^2 h$

volume = pi x radius² x height

π (pi) = 3.14

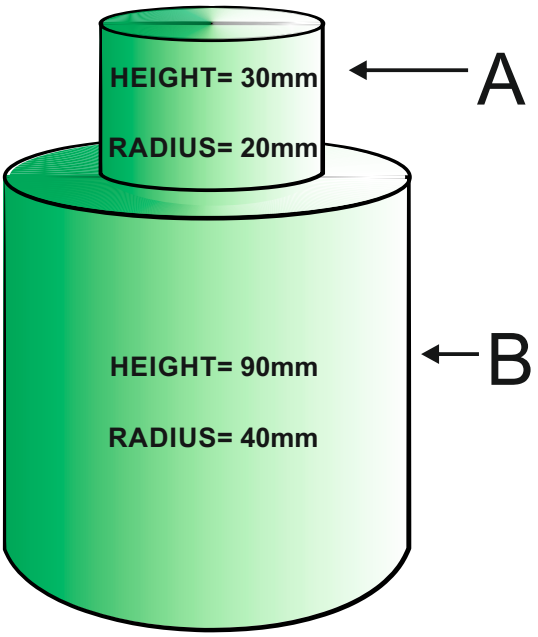






EXAMINATION QUESTION - CYLINDER - VOLUME

The solid steel object seen below, has been manufactured on an engineering centre lathe. It is one solid piece. Calculate the total volume.



In order to calculate the entire volume of the engineered solid, it is treated as two separate parts. Part A is the smaller cylinder and part B is the larger cylinder.

PART A

$v = \pi r^2 h$

volume = 3.14 x 20mm x 20mm x 30mm

volume = 37680mm³

or

volume = 37.680cm³

PART B

$v = \pi r^2 h$

volume = 3.14 x 40mm x 40mm x 90mm

volume = 452160mm³

or

volume = 452.160cm³

Then add both volumes together, to find the overall volume of the engineered object.

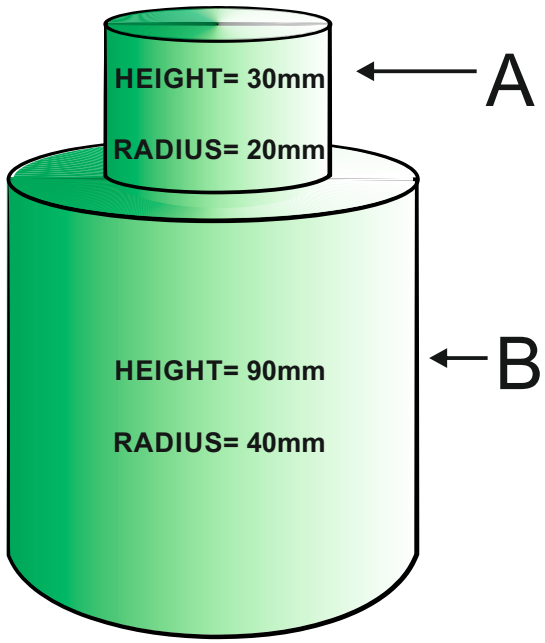
FINAL VOLUME = A + B

FINAL VOLUME = 37680mm³ + 452160mm³

FINAL VOLUME = 489840mm³ or 489.84cm³

EXAMINATION QUESTION - CYLINDER - VOLUME

The solid steel object seen below, has been manufactured on an engineering centre lathe. It is one solid piece. Calculate the total volume.

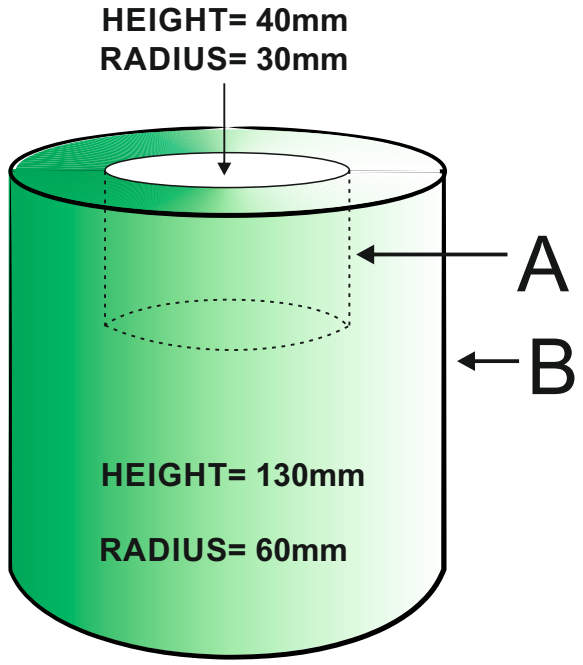


In order to calculate the entire volume of the engineered solid, it is treated as two separate parts. Part A is the smaller cylinder and part B is the larger cylinder.

EXAMINATION QUESTION - CYLINDER - VOLUME

The solid cylindrical object seen below, is engineered from mild steel, with a large machined 'blind' hole, in the top surface.

Calculate the volume of the engineered object.



The cylindrical object is treated as two separate cylinders.

Part A is the 'blind' hole.
Part B is the cylinder.

PART A

$v = \pi r^2 h$

volume = 3.14 x 30mm x 30mm x 40mm

volume = 113040mm³

or

volume = 113.040cm³

PART B

$v = \pi r^2 h$

volume = 3.14 x 60mm x 60mm x 130mm

volume = 1469520mm³

or

volume = 1469.520cm³

Then subtract the volume of part A from the volume of part B, to find the overall volume of the engineered object.

FINAL VOLUME = B - A

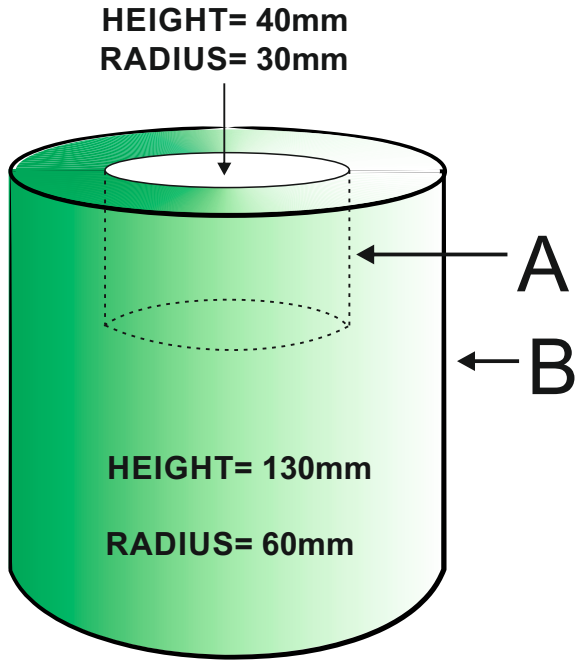
FINAL VOLUME = 1469520mm³ - 113040mm³

FINAL VOLUME = 1356480mm³ or 1356.48cm³

EXAMINATION QUESTION - CYLINDER - VOLUME

The solid cylindrical object seen below, is engineered from mild steel, with a large machined ‘blind’ hole, in the top surface.

Calculate the volume of the engineered object.



The cylindrical object is treated as two separate cylinders.

Part A is the ‘Blind’ hole.
Part B is the cylinder.