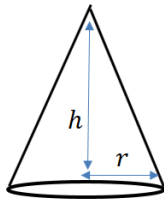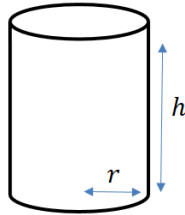# Adding and Subtracting Volumes

With more complex volumes you may need to consider compound areas or volumes of general shapes.

GCSE Reminders:

$V = \dfrac{1}{3}\pi r^2 h$

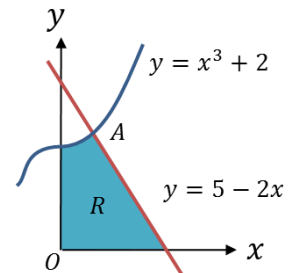h
r

$V = \pi r^2 h$

h
r

Example

The region R is bounded by the curve with equation $y = x^3 + 2$, the line $y = 5 - 2x$ and x and y-axes.

   (a) Verify that the coordinates of A are $(1,3)$.

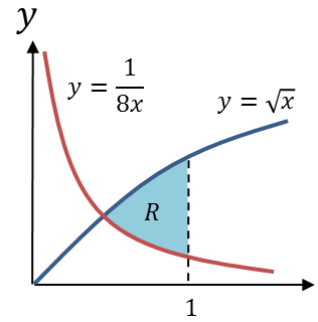A solid is created by rotating the region $360°$ about the x-axis.

(b) Find the volume of this solid.

y

$y = x^3 + 2$

A

$y = 5 - 2x$

R

O

x

Example

The diagram shows the region R bounded by the curves with equations $y = \sqrt{x}$ and $y = \frac{1}{8x}$ and the line $x = 1$.

The region is rotated through $360°$ about the x-axis. Find the exact volume of the solid generated.

The area between the lines with equations $y = x$ and $y = \sqrt[3]{x}$, where $x \geq 0$ is rotated $360°$ about the x-axis. Determine the volume of the solid generated.