**Core Pure 1**

**Volumes of Revolution**

Chapter Overview

**1**: Find the volume when a curve is rotated around the -axis.

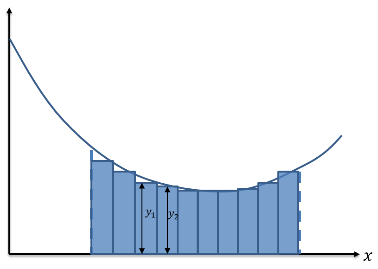
**2**: Find the volume when a curve is rotated around the -axis.

3: Find more complex volumes by adding/subtracting.



**Revolving around the x-axis**

gives the area bounded between , , and the -axis.



If we split up the area into thin rectangular strips,

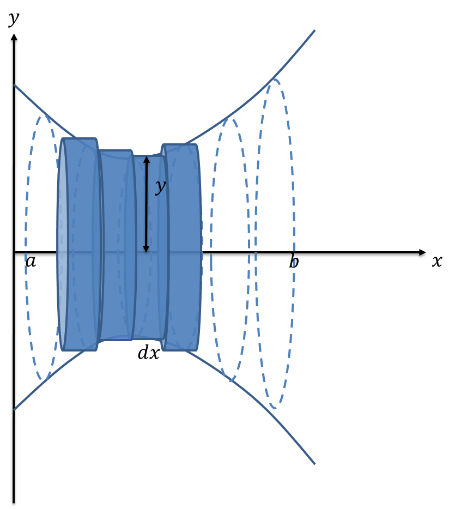
each with width and each with height the

for that particular value of . Each has area .

If we had ‘discrete’ strips, the total area would be:

But because the strips are infinitely small and we have to think continuously, we use instead of .

Integration therefore can be thought of as a continuous version of summation.



Now suppose we spun the line about the

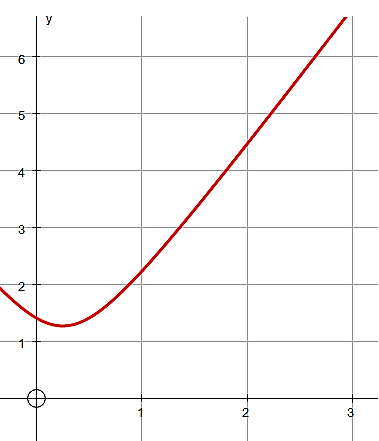
axis to form a solid (known as a *volume of revolution*)

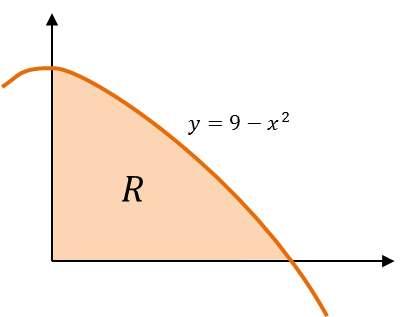
**Examples**

1. The region is bounded by the -axis, the curve with equation

and the lines x = 1 and x = 2 . The region is rotated through about

the -axis. Find the exact volume of the solid generated.

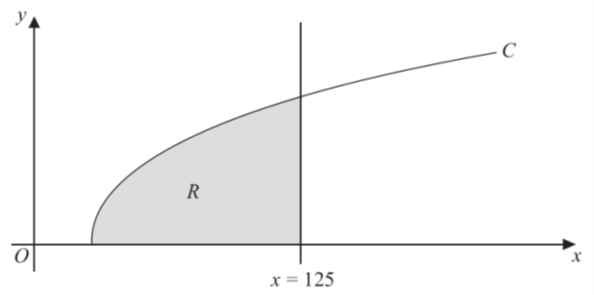


2. The diagram shows the region which is bounded by the -axis, the -axis and the curve with equation . The region is rotated through about the -axis. Find the exact volume of the solid generated.

Test Your Understanding

The finite region *R* which is bounded by the curve *C*, the *x*-axis and the line *x* = 125 is shown shaded in Figure 3. This region is rotated through about the *x*-axis to form a solid of revolution.

Use calculus to find the exact value of the volume of the solid of revolution.  **(5)**



Ex 5a Pg 73-75