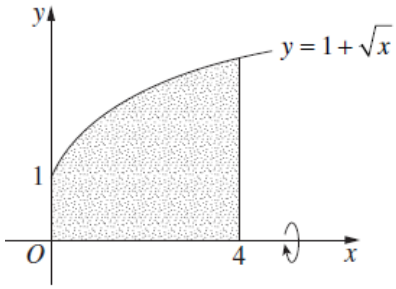
2014 14c The region bounded by the curve $y = 1 + \sqrt{x}$ and the x-axis between $x = 0$ and $x = 4$ is rotated about the x–axis to form a solid. Find the volume of the solid. **3**



$y = 1 + \sqrt{x}$

$y^2 = (1 + \sqrt{x})^2$

$= 1 + 2\sqrt{x} + x$

$= 1 + 2x^{\frac{1}{2}} + x$

$V = \pi \int_0^4 y^2 \, dx$

$= \pi \int_0^4 1 + 2x^{\frac{1}{2}} + x \, dx$

$= \pi \left[x + \frac{4x^{\frac{3}{2}}}{3} + \frac{x^2}{2} \right]_0^4$

$= \pi (4 + \frac{32}{3} + 8 - 0)$

$= \frac{68\pi}{3}$ $\therefore \frac{68\pi}{3}$ units^3

State Mean: **2.14**

* These solutions have been provided by *projectmaths* and are not supplied or endorsed by BOSTES.

Board of Studies: Notes from the Marking Centre

(c) Most candidates were able to demonstrate an understanding of the method for finding a volume of revolution.

Common problems were:

- writing an incorrect expression for y^2;
- not correctly integrating the term with the fractional index
- rotating about the y-axis.

http://www.boardofstudies.nsw.edu.au/hsc_exams/2014/pdf_doc/2014-maths.pdf