2014 16a **3**

Use Simpson's Rule with five function values to show that $\int_{-\frac{\pi}{3}}^{\frac{\pi}{3}} \sec dx \approx \frac{\pi}{9}\left(3+\frac{8}{\sqrt{3}}\right)$.

x	$-\frac{\pi}{3}$	$-\frac{\pi}{6}$	0	$\frac{\pi}{6}$	$\frac{\pi}{3}$
$f(x)$	2	$\frac{2}{\sqrt{3}}$	1	$\frac{2}{\sqrt{3}}$	2

$$\int_{-\frac{\pi}{3}}^{\frac{\pi}{3}} \sec x\,dx \approx \frac{\frac{\pi}{6}}{3}[2+2+2(1)+4(\frac{2}{\sqrt{3}}+\frac{2}{\sqrt{3}})]$$

$$= \frac{\pi}{18}[6+\frac{16}{\sqrt{3}})]$$

$$= \frac{\pi}{9}[3+\frac{8}{\sqrt{3}})]$$

State Mean: **1.40**

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

Board of Studies: Notes from the Marking Centre

This part was generally attempted well with most candidates recognising the appropriate form of Simpson's Rule and using five function values. The most successful attempts started with candidates filling out a table of values and using correct weightings.

Common problems were:

- not correctly evaluating the sec function values, particularly sec $\left(-\frac{\pi}{3}\right)$ and sec $\left(-\frac{\pi}{3}\right)$;
- mixing up the order of the weightings;
- finding the value of 'h' in the table by identifying correct x values, but then attempting to use $h = \frac{b-a}{n}$ incorrectly to find a different value for 'h';
- using values for 'h' expressed in degrees.

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