2017 14 b

(i) Find the exact value of $\int_0^{\frac{\pi}{3}} \cos x \ dx$. **1**

(ii) Using *Trapezoidal rule with three function values**, find an approximation to the integral $\int_0^{\frac{\pi}{3}} \cos x \, dx$, leaving your answer in terms of π and $\sqrt{3}$. **2**

** Changed by projectmaths from Simpson's rule.*

(iii) deleted **1**

(i) $\int_0^{\frac{\pi}{3}} \cos x \ dx = [\sin x]_0^{\frac{\pi}{3}}$

$= \sin\frac{\pi}{3} - \sin 0$

$= \frac{\sqrt{3}}{2} - 0$

$= \frac{\sqrt{3}}{2}$

State Mean: **0.87**

(ii) $\int_0^{\frac{\pi}{3}} \cos x \, dx = \frac{\frac{\pi}{3} - 0}{2(2)}\left[\cos 0 + 2\cos\frac{\pi}{6} + \cos\frac{\pi}{3}\right]$

$= \frac{\pi}{12}\left[1 + 2(\frac{\sqrt{3}}{2}) + \frac{1}{2}\right]$

$= \frac{\pi}{12}\left[\frac{3}{2} + \sqrt{3}\right]$

$= \frac{\pi}{24}\left[3 + 2\sqrt{3}\right]$

State Mean: **N.A.**

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

NESA: Notes from the Marking Centre

(i) A common problem was incorrectly stating $\int \cos x \, dx = -\sin x$.