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2014 11e**3**

Evaluate $\int_0^{\frac{\pi}{2}} \sin \frac{x}{2} dx$.

$$\begin{aligned} \int_0^{\frac{\pi}{2}} \sin \frac{x}{2} dx &= \left[-2 \cos \frac{x}{2} \right]_0^{\frac{\pi}{2}} \\ &= -2(\cos \frac{\pi}{4} - \cos 0) \\ &= -2(\frac{1}{\sqrt{2}} - 1) \\ &= 2 - \frac{2}{\sqrt{2}} \\ &= 2 - \frac{2}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} \\ &= 2 - \sqrt{2} \end{aligned}$$

State Mean:
2.10

* These solutions have been provided by [projectmaths](#) and are not supplied or endorsed by BOSTES.

Board of Studies: Notes from the Marking Centre

Integration involving trigonometric functions proved to be difficult for some candidates. In better responses, candidates used the table of standard integrals to obtain a primitive of the form $a \cos \frac{x}{2}$ and then substituted the limits correctly.

Common problems were:

- getting $\cos \pi$ instead of $\cos \frac{\pi}{4}$ when substituting $\frac{\pi}{2}$ into $\cos \frac{x}{2}$;
- incorrectly calculating $\cos \frac{\pi}{4}$ and/or $\cos 0$;
- using the calculator in degree mode instead in radian mode.

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