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<b>09</b>	<b>2b</b>	(iii) Find $\int_1^4 x^2 + \sqrt{x} \, dx$ .	<b>3</b>
$\begin{aligned} \int_1^4 x^2 + \sqrt{x} \, dx &= \int_1^4 x^2 + x^{\frac{1}{2}} \, dx \\ &= \left[ \frac{x^3}{3} + \frac{2x^{\frac{3}{2}}}{3} \right]_1^4 \\ &= \left[ \frac{(4)^3}{3} + \frac{2(4)^{\frac{3}{2}}}{3} \right] - \left[ \frac{(1)^3}{3} + \frac{2(1)^{\frac{3}{2}}}{3} \right] \\ &= 25\frac{2}{3} \end{aligned}$			State Mean: <b>2.61/3</b>

\* These solutions have been provided by [projectmaths](#) and are not supplied or endorsed by the Board of Studies

### Board of Studies: Notes from the Marking Centre

The better responses in this part involved a fully worked solution displaying four steps, firstly a preparation step involving rewriting  $\sqrt{x}$  as  $x^{\frac{1}{2}}$ , followed by a primitive consisting of two terms, a substitution of correct limits into the primitive with clear indication of signs and brackets, and finally a careful computation of fractions. Candidates were more successful when they explicitly showed the substitution of their limits.

Incorrect primitives of  $x^{\frac{1}{2}}$  included  $\frac{3}{2}x^{\frac{3}{2}}$  or  $x^{\frac{3}{2}}$  and some candidates differentiated both terms. Other common errors resulted from the incorrect evaluation of terms with fractional exponents.

Source: [http://www.boardofstudies.nsw.edu.au/hsc\\_exams/](http://www.boardofstudies.nsw.edu.au/hsc_exams/)