

05	6a	Five values of the function $f(x)$ are shown in the table.	<table><tr><td><math>x</math></td><td>0</td><td>5</td><td>10</td><td>15</td><td>20</td></tr><tr><td><math>f(x)</math></td><td>15</td><td>25</td><td>22</td><td>18</td><td>10</td></tr></table>	$x$	0	5	10	15	20	$f(x)$	15	25	22	18	10	3
		$x$	0	5	10	15	20									
$f(x)$	15	25	22	18	10											
Use Simpson's rule with the five values given in the table to estimate $\int_0^{20} f(x) \, dx$ .																

Simpson's Rule:

$$\int f(x) \, dx \approx \frac{h}{3} [\text{first} + \text{last} + 2 \times \text{odd} + 4 \times \text{even}]$$

$$\begin{aligned}
 \int_0^{20} f(x) \, dx &\approx \frac{5}{3} [15 + 10 + 2 \times 22 + 4 \times (25 + 18)] \\
 &\approx \frac{5}{3} [15 + 10 + 44 + 172] \\
 &\approx \frac{5}{3} [241] \\
 &\approx 401 \frac{2}{3}
 \end{aligned}$$

\* 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

Many candidates clearly knew how to apply Simpson's rule. For many others, however, there was confusion over the 'pattern' of 4 and 2, the value of  $h$ , the number of applications needed, use of the trapezoidal rule and the labelling of ordinates  $y_1, y_2, \dots, y_n$ .

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