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10	2e	Given that $\int_0^6 (x + k) dx = 30$, and k is a constant, find the value of k .	2
$\int_0^6 (x + k) dx = 30$ $\left[\frac{x^2}{2} + kx \right]_0^6 = 30$ $\left[\frac{6^2}{2} + 6k \right] - \left[\frac{0^2}{2} + 0 \right] = 30$ $18 + 6k = 30$ $6k = 30 - 18$ $6k = 12$ $k = 2$			State Mean: 1.51/2

* 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 different correct solutions were in evidence. Candidates who found incorrect primitives such as $\frac{x^2}{2} + \frac{k^2}{2}$ and $\frac{x^2}{2} + k$ had difficulty gaining any marks because k disappeared when the limits of integration were substituted correctly. Many candidates attempted to cope with this by arbitrarily changing a suitable sign. Another correct approach was to use the primitive $\frac{(x+k)^2}{2}$ but the difficulty of the subsequent working was greatly increased. A novel solution was to draw a sketch of $y = x + k$ from 0 to 6 and equate an expression for the area of the trapezium so formed to 30.

Source: http://www.boardofstudies.nsw.edu.au/hsc_exams/