

1 It is given that $I_n = \int_0^1 x^n \sinh x \, dx$, where n is a non-negative integer.

(a) Show that, for $n \geq 2$,

$$I_n = \cosh 1 - n \sinh 1 + n(n-1)I_{n-2}. \quad [3]$$

This image shows a full page of white paper with horizontal dashed lines, typical of primary school handwriting practice paper. The lines are evenly spaced and run across the entire width of the page. There are no margins, text, or other markings present.

(b) Find the exact value of I_2 . [2]

[illegible]