

STEP III, 2014 , Q2 MS

2. The first part is solved using the given method, the formula $\cosh 2x = 2 \cosh^2 x - 1$, and then employing partial fractions or the standard form quoted in the formula book. The second part requires the substitution, $u = \sinh x$, the formula $\cosh 2x = 1 + 2 \sinh^2 x$, and a standard form to give $\frac{\sqrt{2}}{2} \tan^{-1} \sqrt{2} u + c$. The third part can be approached by making the substitution $u = e^x$ and division of the resulting fraction in the numerator and denominator by e^{2x} to give half the difference of the integrals in the first two parts. Alternatively, a similar style of working with the substitution $u = e^{-x}$ results in a sum instead of a difference.



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