

Solution (#1398) Set $u = \cosh x$ to find

$$\int \frac{\sinh x \, dx}{\sqrt{a^2 - \cosh^2 x}} = \int \frac{du}{\sqrt{a^2 - u^2}} = \sin^{-1} \left(\frac{\cosh x}{a} \right) + \text{const.}$$

So for the second integral note

$$b^2 - \sinh^2 x = b^2 + 1 - \cosh^2 x$$

and use the first part.