PROOF OF FORMULA 2.423.9

$$\int \frac{dx}{\cosh x} = \tan^{-1}(\sinh x) = \sin^{-1}(\tanh x) = 2\tan^{-1}(e^x) = \mathrm{gd}(x)$$

Let $t = e^x$ to obtain

$$\int \frac{dx}{\cosh x} = 2\int \frac{dt}{t^2+1} = 2\tan^{-1} t = 2\tan^{-1}(e^x).$$

The other formulas are derived by similar changes of variables.