

$$\begin{aligned}
 \tanh\left(\frac{\pi}{4}i\right) &= \frac{\sinh\frac{\pi}{4}i}{\cosh\frac{\pi}{4}i} = \left\{ \begin{array}{l} \sinh z = \frac{e^{iz} - e^{-iz}}{2i} \\ \cosh z = \frac{e^{iz} + e^{-iz}}{2} \end{array} \right\} = \\
 &= \frac{\frac{e^{-\frac{\pi}{4}} - e^{\frac{\pi}{4}}}{2i}}{\frac{e^{-\frac{\pi}{4}} + e^{\frac{\pi}{4}}}{2}} = i \frac{\left(\frac{e^{-\frac{\pi}{4}} - e^{\frac{\pi}{4}}}{2}\right)}{\frac{e^{\frac{\pi}{4}} + e^{-\frac{\pi}{4}}}{2}} = \\
 \left\{ \begin{array}{l} \sinh x = \frac{e^x - e^{-x}}{2} \\ \cosh x = \frac{e^x + e^{-x}}{2} \end{array} \right\} &= \frac{i \sinh \frac{\pi}{4}}{\cosh \frac{\pi}{4}} = i \tanh \frac{\pi}{4}
 \end{aligned}$$