

$$\begin{aligned}
(1-i)^{(1+i)} &= \left( \sqrt{2} e^{i\frac{3\pi}{2}} \right)^{(1+i)} = \sqrt{2}^{(1+i)} e^{i\frac{3\pi}{2}(1+i)} \\
&= e^{(1+i)\ln\sqrt{2}} \cdot e^{i\frac{3\pi}{2} - \frac{3\pi}{2}} \\
&= e^{\ln\sqrt{2}} \cdot e^{i\ln\sqrt{2}} \cdot e^{i\frac{3\pi}{2}} \cdot e^{-\frac{3\pi}{2}} \\
&= e^{\ln\sqrt{2} - \frac{3\pi}{2}} \cdot e^{i(\ln\sqrt{2} + \frac{3\pi}{2})}
\end{aligned}$$