$$\operatorname{ctg}(-\pi+2i) = \left\{ \begin{array}{l} \operatorname{ctg} z = \dfrac{\cos z}{\sin z} \\ \cos z = \dfrac{e^{iz}+e^{-iz}}{2} \\ \sin z = \dfrac{e^{iz}-e^{-iz}}{2i} \end{array} \right\} =$$

$$= \frac{\dfrac{e^{-\pi i-2}+e^{\pi i+2}}{2}}{\dfrac{e^{-\pi i-2}-e^{\pi i+2}}{2i}} =$$

$$= \frac{e^{-2}(\cos\pi - i\sin\pi) + e^{2}(\cos\pi + i\sin\pi)}{2} \cdot =$$

$$= \frac{e^{-2}(-1-0)+e^{2}(-1+0)}{2} =$$

$$= \frac{\dfrac{-e^{-2}-e^{2}}{2}}{\dfrac{-e^{-2}+e^{2}}{2i}} = \frac{* \dfrac{(e^{2}+e^{-2})}{2}}{* i \dfrac{(e^{2}-e^{-2})}{2}} =$$

$$= \left\{ \begin{array}{l} \cosh x = \dfrac{e^{x}+e^{-x}}{2} \\ \sinh x = \dfrac{e^{x}-e^{-x}}{2} \end{array} \right\} = \frac{\cosh 2}{i \sinh 2} = -i \operatorname{ctgh} 2$$