$$\underbrace{a-\overset{*}{a}} \boldsymbol{\times} \underbrace{b-\overset{*}{b}} = 2\underbrace{\overset{*}{a}b-\overset{*}{b}a}$$

$$\underbrace{a-z\overset{*}{a}z}\frac{\partial}{\partial z} \boldsymbol{\times} \underbrace{b-z\overset{*}{b}z}\frac{\partial}{\partial z} = \underbrace{a-z\overset{*}{a}z}\frac{\partial}{\partial z}\underbrace{b-z\overset{*}{b}z}\frac{\partial}{\partial z} - \underbrace{b-z\overset{*}{b}z}\frac{\partial}{\partial z}\underbrace{a-z\overset{*}{a}z}\frac{\partial}{\partial z}$$
$$= \overbrace{\underbrace{a-z\overset{*}{a}z}\frac{\partial}{\partial z}\underbrace{b-z\overset{*}{b}z} - \underbrace{b-z\overset{*}{b}z}\frac{\partial}{\partial z}\underbrace{a-z\overset{*}{a}z}}\frac{\partial}{\partial z} = 2\underbrace{z\overset{*}{a}b-z\overset{*}{b}a}\frac{\partial}{\partial z}$$