1. FUNCIONS EXPONENCIALS

$$e^z = e^{x+iy} = e^x(\cos y + i\sin y)$$
$$z^c = e^{c\cdot\ln z} = \exp[c\cdot\ln z];\ z,c\in\mathbb{C}$$

2. FUNCIONS TRIGONOMÈTRIQUES

$$\sin z = \frac{e^{iz}-e^{-iz}}{2i} \qquad \cos z = \frac{e^{iz}+e^{-iz}}{2}$$
$$\sec z = \frac{1}{\cos z} = \frac{2}{e^{iz}+e^{-iz}} \qquad \csc z = \frac{1}{\sin z} = \frac{2i}{e^{iz}-e^{-iz}}$$
$$\tan z = \frac{\sin z}{\cos z} = \frac{e^{iz}-e^{-iz}}{i\left(e^{iz}+e^{-iz}\right)} \qquad \cot z = \frac{1}{\tan z} = \frac{\cos z}{\sin z} = \frac{i\left(e^{iz}+e^{-iz}\right)}{e^{iz}-e^{-iz}}$$

I) $\sin^2 z + \cos^2 z = 1$
II) $1+\tan^2 z = \sec^2 z$
III) $1+\cot^2 z = \csc^2 z$
IV) $\sin(-z) = -\sin z$
V) $\cos(-z) = \cos z$
VI) $\tan(-z) = -\tan z$
VII) $\sin(z_1 \pm z_2) = \sin z_1\cos z_2 \pm \cos z_1 \sin z_2$
VIII) $\cos(z_1 \pm z_2) = \cos z_1\cos z_2 \mp \sin z_1 \sin z_2$
IX) $\tan(z_1 \pm z_2) = \dfrac{\tan z_1 \pm \tan z_2}{1 \mp \tan z_1 \tan z_2}$

3. FUNCIONS HIPERBÒLIQUES

$$\sinh z = \frac{e^z - e^{-z}}{2} \qquad \cosh z = \frac{e^z + e^{-z}}{2}$$
$$\operatorname{sech} z = \frac{1}{\cosh z} = \frac{2}{e^z+e^{-z}} \qquad \operatorname{csch} z = \frac{1}{\sinh z} = \frac{2}{e^z-e^{-z}}$$
$$\tanh z = \frac{\sinh z}{\cosh z} = \frac{e^z-e^{-z}}{e^z+e^{-z}} \qquad \coth z = \frac{1}{\tanh z} = \frac{\cosh z}{\sinh z} = \frac{e^z+e^{-z}}{e^z-e^{-z}}$$

I) $\sinh^2 z - \cosh^2 z = 1$
II) $1-\tanh^2 z = \operatorname{sech}^2 z$
III) $\coth^2 z - 1 = \operatorname{csch}^2 z$
IV) $\sinh(-z) = -\sinh z$
V) $\cosh(-z) = \cosh z$
VI) $\tanh(-z) = -\tanh z$
VII) $\sinh(z_1 \pm z_2) = \sinh z_1\cosh z_2 \pm \cosh z_1 \sinh z_2$
VIII) $\cosh(z_1 \pm z_2) = \cosh z_1\cosh z_2 \pm \sinh z_1 \sinh z_2$

IX) $\tanh(z_1 \pm z_2) = \dfrac{\tanh z_1 \pm \tanh z_2}{1 \pm \tanh z_1 \tanh z_2}$

$\sin iz = i\sinh z$	$\cos iz = \cosh z$	$\tan iz = i\tanh z$
$\sinh iz = i\sin z$	$\cosh iz = \cos z$	$\tanh iz = i\tan z$

4. FUNCIONS LOGARÍTMIQUES

$\ln z = \ln r + i(\theta + 2\pi n) = \ln|z| + i\arg z = \ln r + i\theta$ [1]

$\log_a^z = \dfrac{\ln z}{\ln a}$

5. FUNCIONS TRIGRONOMÈTRIQUES INVERSES

$\sin^{-1} z = 2\pi k + \dfrac{1}{i}\ln\left(iz + \sqrt{1-z^2}\right)$ $\qquad$ $\csc^{-1} z = 2\pi k + \dfrac{1}{i}\ln\left(\dfrac{i+\sqrt{z^2-1}}{z}\right)$

$\cos^{-1} z = 2\pi k + \dfrac{1}{i}\ln\left(z + \sqrt{z^2-1}\right)$ $\qquad$ $\sec^{-1} z = 2\pi k + \dfrac{1}{i}\ln\left(\dfrac{1+\sqrt{z^2-1}}{z}\right)$

$\tan^{-1} z = \pi k + \dfrac{1}{2i}\ln\left(\dfrac{1+z}{1-z}\right)$ $\qquad$ $\cot^{-1} z = \pi k + \dfrac{1}{2i}\ln\left(\dfrac{z+i}{z-i}\right)$

6. FUNCIONS HIPERBÒLIQUES INVERSES

$\sinh^{-1} z = 2\pi ki + \ln\left(z + \sqrt{z^2+1}\right)$ $\qquad$ $\operatorname{csch}^{-1} z = 2\pi ki + \ln\left(\dfrac{1+\sqrt{z^2+1}}{z}\right)$

$\cosh^{-1} z = 2\pi ki + \ln\left(z + \sqrt{z^2-1}\right)$ $\qquad$ $\operatorname{sech}^{-1} z = 2\pi ki + \ln\left(\dfrac{1+\sqrt{1-z^2}}{z}\right)$

$\tanh^{-1} z = \pi ki + \dfrac{1}{2}\ln\left(\dfrac{1+z}{1-z}\right)$ $\qquad$ $\coth^{-1} z = \pi ik + \dfrac{1}{2}\ln\left(\dfrac{z+1}{z-1}\right)$

[1] $r = \sqrt{a^2+b^2}$ i $\theta = \arctan\dfrac{b}{a}$