1) $z^2 - 3iz - 3 + i = 0$

$$z = \frac{3i \pm \sqrt{-9 - 4 \cdot 1 \cdot (-3+i)}}{2} = \boxed{\frac{3i \pm \sqrt{3-4i}}{2}}$$

Sei: $\sqrt{3-4i} = a+bi$

$a, b \in \mathbb{R}$: $(\sqrt{3-4i})^2 = (a+bi)^2 \Rightarrow 3-4i = a^2 + 2abi - b^2$

$\Rightarrow 3-4i = a^2 - b^2 + 2abi$

$\Rightarrow a^2 - b^2 = 3 \quad | \quad 2ab = -4$

$b = \frac{-2}{a}$

$a^2 - \left(\frac{-2}{a}\right)^2 = 3$

$a^2 - 4/a^2 = 3$

$a^4 - 4 = 3a^2$

$a^4 - 3a^2 - 4 = 0$

$(a^2 - 4)(a^2 + 1) = 0$

$a^2 = 4 \quad | \quad a^2 \neq -1$

$a = \pm 2$

$\Rightarrow a = 2, \; b = -1 \quad a+bi = 2 - i$

$a = -2, \; b = 1 \quad a+bi = -2 + i$

$$z = \frac{3i + (i-2)}{2}, \quad \frac{3i + (2-i)}{2}$$

$$\boxed{z = 2i - 1 \quad z = 1 + i}$$

$-(2-i)$