Find all possible values of $(1+i)^i$. [99 清大工科乙丙核工甲先進光源 7(b)]

[解]$(1+i)^i = \exp[i\ln(1+i)] = \exp\{i\ln[\sqrt{2}e^{i(\frac{\pi}{4}+2k\pi)}]\} = \exp\{i[\ln\sqrt{2} + i(\frac{\pi}{4} + 2k\pi)]\}$

$= \exp[i\ln\sqrt{2} - (\frac{\pi}{4} + 2k\pi)] = e^{i\ln\sqrt{2}} \cdot e^{-(\frac{\pi}{4}+2k\pi)} = e^{-(\frac{\pi}{4}+2k\pi)}(\cos\ln\sqrt{2} + i\sin\ln\sqrt{2})$

其中 $k = 0, \pm1, \pm2, \cdots$