$$\sum_{m=1}^{n} \frac{1}{(1+i)^m} = \frac{1-(1+i)^{-n}}{i}$$

$$\sum_{m=1}^{n} \frac{1}{r^m} = \frac{1}{r} + \frac{1}{r^2} + \cdots + \frac{1}{r^n}$$

$$A = \frac{1}{r} + \cancel{\frac{1}{r^2}} + \cdots + \cancel{\frac{1}{r^n}}$$

$$\frac{1}{r} \cdot A = \cancel{\frac{1}{r^2}} + \cancel{\frac{1}{r^3}} + \cdots + \frac{1}{r^{n+1}}$$

$$A - \frac{A}{r} = \frac{1}{r} - \frac{1}{r^{n+1}} \Rightarrow A\left(1-\frac{1}{r}\right) = \frac{1}{r} - \frac{1}{r^{n+1}} = \frac{r^n - 1}{r^{n+1}}$$

$$A\left(\frac{r-1}{r}\right) = \frac{r^n-1}{r^{n+1}} \Rightarrow \cancel{A} =$$

$$A = \frac{r^n - 1}{r^{n+1}} \cdot \frac{r}{(r-1)} \Rightarrow \frac{r^n - 1}{(r-1) \cdot r^n}$$

$r = 1+i$ olursa

$$\frac{(1+i)^n - 1}{(\cancel{1}+i-\cancel{1}) \cdot (1+i)^n} = \frac{(1+i)^n - 1}{i\,(1+i)^n}$$

$$= \frac{\cancel{(1+i)^n}\left(1-(1+i)^{-n}\right)}{i\,\cancel{(1+i)^n}} = \frac{1-(1+i)^{-n}}{i}$$