

$$\text{Apart}\left[\frac{1}{1-x-x^2}\right]$$

$$-\frac{1}{-1+x+x^2}$$

$$\text{Factor}\left[\frac{1}{1-x-x^2}\right]$$

$$-\frac{1}{-1+x+x^2}$$

$$\text{Factor}\left[\frac{1}{1-x-x^2}, \text{Extension} \rightarrow \text{Root}[1-x-x^2, 1]\right]$$

$$\frac{1}{(-1+\sqrt{5}-2x)(1+\sqrt{5}+2x)}$$

$$\text{Factor}\left[\frac{1}{1-x-x^2}, \text{Extension} \rightarrow \text{Root}[1-x-x^2, 1]\right] // \text{Apart}$$

$$\frac{1}{\sqrt{5}(-1+\sqrt{5}-2x)} + \frac{1}{\sqrt{5}(1+\sqrt{5}+2x)}$$

$$\left(\text{Factor}\left[\frac{1}{1-x-x^2}, \text{Extension} \rightarrow \text{Root}[1-x-x^2, 1]\right] // \text{Apart}\right) /. \frac{a}{b+c*x} \rightarrow \frac{a}{b} \left(-\frac{c}{b}\right)^n$$

$$\frac{\left(\frac{1}{2}(-1+\sqrt{5})\right)^{-1-n}}{\sqrt{5}} + \frac{(-1)^n 2^{1+n} (1+\sqrt{5})^{-1-n}}{\sqrt{5}}$$

$$\left(\text{Factor}\left[\frac{1}{1-x-x^2}, \text{Extension} \rightarrow \text{Root}[1-x-x^2, 1]\right] // \text{Apart}\right) /. \frac{a}{b+c*x} \rightarrow \frac{a}{b} \left(-\frac{c}{b}\right)^n /. n \rightarrow 100 // \text{Simplify}$$

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