$\underline{\substack{2.84 \\ ?2}}$

$n=1$ $\quad \dfrac{x}{1-x^2} = \dfrac{1}{1-x} \cdot \dfrac{x-x}{1-x^2}$

$$= \cancel{\frac{1}{1-x}} \cdot \frac{x\cancel{(1-x)}}{1-x^2}$$

$n=k+1$ $\quad \underbrace{\dfrac{x}{1-x^2} + \ldots + \dfrac{x^{2^{n-1}}}{1-x^{2^n}}} + \dfrac{x^{2^n}}{1-x^{2^{n+1}}} \stackrel{?}{=} \dfrac{1}{1-x} \cdot \dfrac{x-x^{2^{n+1}}}{1-x^{2^{n+1}}}$

$$\frac{1}{1-x} \cdot \frac{x-x^{2^n}}{1-x^{2^n}} + \frac{x^{2^n}}{1-x^{2^{n+1}}} \stackrel{?}{=} \frac{1}{1-x} \cdot \frac{x-x^{2^{n+1}}}{1-x^{2^{n+1}}}$$

$$\frac{1}{1-x} \cdot \frac{x-x^{2^n}}{1-x^{2^n}} \stackrel{?}{=} \frac{-x^{2^n}(1-x) + x - x^{2^{n+1}}}{(1-x)(1-x^{2^{n+1}})}$$

$$\frac{1}{1-x} \cdot \frac{x-x^{2^n}}{1-x^{2^n}} \stackrel{?}{=} \frac{x - x^{2^n} + x^{1+2^n} - (x^{2^n})^2}{(1-x)(1-x^{2^{n+1}})}$$

$$\stackrel{?}{=} \frac{x(1+x^{2^n}) - x^{2^n}(1+x^{2^n})}{(1-x)(1-x^{2^{n+1}})} = \frac{(x-x^{2^n})(1+x^{2^n})}{(1-x)(1-x^{2^{n+1}})}$$

$$\hookrightarrow \; = \frac{(x-x^{2^n})\cancel{(1+x^{2^n})}}{(1-x)(1-x^{2^n})\cancel{(1+x^{2^n})}}$$