3.6. $a_n = 1 + 2 + \dots + 2^n + (-\sqrt{2})^n$

~~$a_n = (2-1)(2^{n+1}-1) + (-\sqrt{2})^n$~~

$a_n = (2-1)(2^n + 2^{n-1} + \dots + 2 + 1) + (-\sqrt{2})^n$

$a_n = (2^{n+1} - 1) + (-\sqrt{2})^n$

$a_n = \alpha(x) + \beta(x) + \gamma(x)$

$a_n = \frac{2}{1-2x} + \frac{1}{1-x} + \frac{1}{1+\sqrt{2}x}$

$\alpha(x) = \sum_{n=0}^{\infty} 2^n x^n = 2 \cdot \frac{1}{1-2x}$

$\beta(x) = \sum_{n=0}^{\infty} x^n = \frac{1}{1-x}$

$\gamma(x) = \sum_{n=0}^{\infty} (-\sqrt{2})^n x^n = \frac{1}{1+\sqrt{2}x}$