

Cornerstone Formula

$$1 \quad (y-x) \sum_{k=0}^n y^k x^{n-k}$$

$$2 \quad = y \sum_{k=0}^n y^k x^{n-k} - x \sum_{k=0}^n y^k x^{n-k}$$

$$3 \quad = \sum_{k=0}^n y^{k+1} x^{n-k} - \sum_{k=0}^n y^k x^{n+1-k}$$

$$4 \quad = \sum_{k=1}^{n+1} y^{(k-1)+1} x^{n-(k-1)} - (\sim)$$

$$5 \quad = \sum_{k=1}^{n+1} y^k x^{n+1-k} - (\sim)$$

$$6 \quad = \left(y^{n+1} + \sum_{k=1}^n y^k x^{n+1-k} \right) - \left(x^{n+1} + \sum_{k=1}^n y^k x^{n+1-k} \right)$$

$$7 \quad = y^{n+1} - x^{n+1}$$