

$$\sum_{i=2}^n (x_i - x_{i-1}) = (\cancel{x_2} - x_1) + (\cancel{x_3} - \cancel{x_2}) + (x_4 - \cancel{x_3}) \\ + \dots + (\cancel{x_{n-1}} - x_{n-2}) + (x_n - \cancel{x_{n-1}})$$

$$= -x_1 + x_n = x_n - x_1$$