Geometric Sum:

$$ar^0 + ar^1 + \ldots + ar^{n+1} = \frac{a(r^{n+1}-1)}{r-1} + ar^{n+1}$$

$$= \frac{ar^{n+1} - a + (r-1)\,ar^{n+1}}{r-1}$$

$$= \frac{\cancel{ar^{n+1}} - a + a \times r \times r^{n+1} \cancel{- ar^{n+1}}}{r-1}$$

$$= \frac{-a + a \times r \times r^{n+1}}{r-1}$$

$$= \frac{-a + a \times r^{n+2}}{r-1}$$

$$= \frac{a(r^{n+2}-1)}{r-1}$$

$$\boldsymbol{ar^{n+1} - ar^{n+1} = 0}$$