$$
\begin{aligned}
S &= \sum_{n=a}^{b} r^n \\
S &= r^a + r^{a+1} + r^{a+2} + \cdots + r^{b-2} + r^{b-1} + r^b \\
rS &= r^{a+1} + r^{a+2} + \cdots + r^{b-2} + r^{b-1} + r^b + r^{b+1} \\
rS &= r^a + r^{a+1} + r^{a+2} + \cdots + r^{b-2} + r^{b-1} + r^b + r^{b+1} - r^a \\
rS &= S + r^{b+1} - r^a \\
rS - S &= r^{b+1} - r^a \\
S(r-1) &= r^{b+1} - r^a \\
S &= \frac{r^{b+1} - r^a}{r-1}
\end{aligned}
$$

$$
\therefore \boxed{\sum_{n=a}^{b} r^n = \frac{r^{b+1} - r^a}{r^{0+1} - r^0}}
$$

Henlo