52

(317)

$q=2$

$S_{2n}=255$

$S^*_{\text{חדשה}}=8738$

$$\begin{cases} 255 = \dfrac{a_1(q^{2n}-1)}{q-1} \\ 8738 = \dfrac{a_1 a_2 (q^{4n}-1)}{q^4-1} = \dfrac{a_1^2 q (q^{2n}-1)(q^{2n}+1)}{(q^2-1)(q^2+1)} \end{cases}$$

$$\begin{cases} 255 = a_1(2^{2n}-1) \quad /()^2 \\ 8738 = \dfrac{2a_1^2(2^{2n}-1)(2^{2n}+1)}{15} \quad /: \dfrac{2}{15} \end{cases}$$

$$\begin{cases} 65535 = a_1^2 (2^{2n}-1)(2^{2n}+1) \\ 65025 = a_1^2 (2^{2n}-1)^2 \end{cases}$$

$$\frac{13107}{13005} = \frac{2^{2n}+1}{2^{2n}-1}$$

$$13107 \cdot 2^{2n} - 13107 = 13005 \cdot 2^{2n} + 13005$$

$$102 \cdot 2^{2n} = 26112 \quad /:102$$

$$2^{2n} = 256 = 2^8$$

$$\boxed{n=4}$$

כי הסדרה החדשה היא הנדסית

$$\frac{a_n a_{n+1}}{a_{n-2} a_{n-1}} = q^{2}$$

$q=2$ מנה