$$\begin{cases} a_1 * a_2 * a_3 = 729 \\ {a_1}^2 + {a_2}^2 + {a_3}^2 = 819 \\ a_{n+1} = q a_n \end{cases}$$

$$\begin{cases} a_1 * q a_1 * q^2 a_1 = q^3 {a_1}^3 = 729 \\ {a_1}^2 + q^2 {a_1}^2 + q^4 {a_1}^2 = 819 \end{cases}$$

$$a_1 = \frac{9}{q} \quad => \quad \left(\frac{9}{q}\right)^2 (1 + q^2 + q^4) = 819 \quad => \quad \frac{1}{q^2} + 1 + q^2 = \frac{819}{81} = \frac{91}{9}$$

$$\frac{1 + q^2 + q^4 - \frac{91}{9} q^2}{q^2} = 0 \quad => \quad q = 3$$

$$\begin{cases} a_1 = 3 \\ a_2 = 9 \\ a_3 = 27 \end{cases}$$