Geometric Sequence 4

The first element is $a_1 = 2$, S_n is the Sum

$S_n = 2 + 2q + 2q^2 + \text{----------} + 2q^{n-1}$ -

$S_n .q = 0 + 2q + 2q^2 + - - - - - -2q^{1-1} + 2q^n$

$Sn - Sn.q = 2 - 2q^n$

$Sn(1 - q) = 2(1 - q^n)$, $q \neq 1$

$S_n = 2 . \frac{q^n-1}{q-1}$, $S_n = a_1 . \frac{q^n-1}{q-1}$

Example :

$S_3 = 1 + q + q^2 = ?$

$a_1 = 1$

$n = 3$

$q \neq 1$, $S_3 = \frac{q^3-1}{q-1}$ $1+q+q^2 = \frac{q^3-1}{q-1}$

$q = 2$

Find: 1+2+4+8+16 = ?

$a_1 = 1$, $q = 2$, $n = 5$

$S_5 = \frac{2^5-1}{2-1} = 2^5 - 1 = 32 - 1 = 31$