

(1) The Jacpbstahl numbers are defined as

$$J_n = J_{n-1} + 2J_{n-2}, \quad J_0 = 0, J_1 = 1.$$

Show that

(a) $J_{n-1} + J_n = 2^n$;

(b) $J_n = 2J_{n-1} + (-1)^n$;

(c) $3|J_n$ iff $n = 3k + 2$, for all integers $k \geq 0$.

(d) $J_n = \frac{2^{n+1} + (-1)^n}{3}$.

(2) Examine the numbers defined by

$$a_n = a_1 + \cdots + a_{n-1}, \quad a_1 = 3.$$

Find the general formula for a_n .