

LIMITI DI SUCCESSIONI

Calcolare $\lim_{n \rightarrow \infty} a_n$ dove

$$(1) a_n = \frac{n}{(n+1)^2 - (n-1)^2}$$

$$(3) a_n = \frac{(2n+1)^3 + (3n^2+1)^2 + 5n^4}{n^5 - n^6}$$

$$(5) a_n = \frac{(2n+1)^3 + (3n^2+1)^2 + 5n^4}{n^5}$$

$$(7) a_n = \frac{((2n+1)^2 - 1)^2 - ((2n-1)^2 + 1)^2}{(3n+1)^2 + n^2}$$

$$(9) a_n = \frac{(3+3n)^3 + (3-3n)^3}{(3n+3)^3 - (3n-3)^3}$$

$$(11) a_n = 1 + \frac{1}{n + \frac{1}{n}}$$

$$(13) a_n = \frac{1 + (-1)^n}{n}$$

$$(15) a_n = (2 + (-1)^n) n$$

$$(17) a_n = \frac{2 + \frac{(-1)^n}{n}}{3 + \frac{(-1)^n}{n}}$$

$$(19) a_n = \sqrt{n^2+n} - n$$

$$(21) a_n = \sqrt{n^2+1} - n$$

$$(23) a_n = \sqrt{\sqrt{n^2+n} - n} - \sqrt{n}$$

$$(25) a_n = (\sqrt{n+1} - \sqrt{n})^4 \cdot n^2$$

$$(27) a_n = \frac{2^n + n^2}{3^n + n^3}$$

$$(29) a_n = \frac{2^{2n+1} + 3^n}{4^{n+1} + 3^n}$$

$$(2) \frac{3n^4 - 4n^3}{(n + \frac{1}{n})^4} = a_n$$

$$(4) \left(\frac{2n+1}{3n+1}\right)^4 = a_n$$

$$(6) \frac{1-n^3+2n^2}{n^2-1+2n^3} = a_n$$

$$(8) \frac{(3n+1)^2 \cdot (2n^2-1)^3}{(5n^2-3n+1)^4} = a_n$$

$$(10) \frac{n \cdot (2n - \frac{3}{n})^2}{(3n+1)^3} - \frac{(n^2+1)^3}{(n^3+1)^2} = a_n$$

$$(12) \left(\frac{n}{2n+1} + \frac{2n-1}{n+1}\right)^5 = a_n$$

$$(14) n(-1)^{2n} = a_n$$

$$(16) n(-1)^{2n+1} = a_n$$

$$(18) \sqrt{n+1} - \sqrt{n} = a_n$$

$$(20) \sqrt{n^2+n} + n = a_n$$

$$(22) n \cdot (\sqrt{n^2+1} - n) = a_n$$

$$(24) \sqrt{\sqrt{n^2+n} - n} = a_n$$

$$(26) \left[\frac{1}{4n} - (\sqrt{n+1} - \sqrt{n})^2\right] \cdot n = a_n$$

$$(28) \frac{3^n + n^2}{2^n + n^3} = a_n$$

$$(30) \frac{2^{2n} + n^4 \cdot 3^n}{4^n + n^5 \cdot 3^n}$$

Soluzioni (1) $\frac{1}{4}$ (2) $\frac{3}{4}$ (3) 0 (4) $\left(\frac{2}{3}\right)^4$ (5) 0 (6) $-\frac{1}{2}$ (7) $+\infty$ (8) $\frac{3 \cdot 2^3}{5^4}$ (9) (10)

(11) (12) (13) (14) (15) (16) (17) (18) (19) (20) (21)

(22) (23) (24) (25) (26)

Soluzioni (1) $1/4$ (2) 3 (3) 0 (4) $(2/3)^4$ (5) 0 (6) $-1/2$ (7) $+\infty$

(8) $\frac{3^2 \cdot 2^3}{5^4}$ (9) 1 (10) $\frac{2^2}{3^3} - 1$ (11) 1 (12) $(\frac{1}{2} + 2)^5$ (13) 0 (14) $+\infty$

(15) $+\infty$ (16) 0 (17) $2/3$ (18) 0 (19) $1/2$ (20) $+\infty$ (21) 0

(22) $1/2$ (23) $-\infty$ (24) $1/\sqrt{2}$ (25) $1/24$ (26) 0

(27) 0 (28) $+\infty$ (29) $1/2$ (30) 1