ESERCIZI 7

(1) Calcolare i seguenti limiti di successioni:

a) $\displaystyle\lim_{n\to+\infty} \frac{n+1}{n^2-n+3}$

b) $\displaystyle\lim_{n\to+\infty} \frac{n^2-1}{n+4}$

c) $\displaystyle\lim_{n\to+\infty} \frac{3n^3-8n}{2n^3+4n^2-n+1}$

d) $\displaystyle\lim_{n\to+\infty} \sqrt[n]{n^4+1}$

e) $\displaystyle\lim_{n\to+\infty} \left(\frac{n}{n+1} - \frac{n+1}{n}\right)$

f) $\displaystyle\lim_{n\to+\infty} \left(\frac{n^2}{n+1} - \frac{n^2+1}{n}\right)$

g) $\displaystyle\lim_{n\to+\infty} \sqrt{n^2+n} - n$

h) $\displaystyle\lim_{n\to+\infty} n\left(\sqrt{n^2+n} - n\right)$

i) $\displaystyle\lim_{n\to+\infty} \frac{n^2+\sin n}{1+n+n^2}$

j) $\displaystyle\lim_{n\to+\infty} \frac{n+2^n}{n^2+3^n}$

k) $\displaystyle\lim_{n\to+\infty} \frac{3^n-1}{3^n+1}$

l) $\displaystyle\lim_{n\to+\infty} \frac{\log n}{\log_5 n + 1}$

m) $\displaystyle\lim_{n\to+\infty} \frac{\log n}{n^3-3}$

n) $\displaystyle\lim_{n\to+\infty} (n! + n - \log n)$

o) $\displaystyle\lim_{n\to+\infty} n\left(\sqrt{n+1} - \sqrt{n}\right)$

p) $\displaystyle\lim_{n\to+\infty} \left(\sqrt[3]{n^3+n^2+1} - n\right)$

q) $\displaystyle\lim_{n\to+\infty} (\log n - n!)$

r) $\displaystyle\lim_{n\to+\infty} (3^n - \log_3 n)$

s) $\displaystyle\lim_{n\to+\infty} \frac{2^n}{n!}.$

(2) Stabilire quali delle seguenti successioni sono limitate, quali sono monotone, quali sono regolari:

$$a_n = \frac{n+1}{n} \qquad b_n = \frac{1}{n!} \qquad c_n = (-1)^n 3^n$$

$$d_n = \left(1+\frac{1}{n}\right)^{-n} \qquad e_n = \log(2n) \qquad f_n = n\log_{10} n$$

$$g_n = \frac{2n^2-1}{n^2} \qquad h_n = \sin(2\pi n) \qquad i_n = \cos\left(\frac{\pi n}{2}\right).$$

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Alcune soluzioni degli Esercizi 7

(1) **a)** 0, **b)** $+\infty$, **c)** $\dfrac{3}{2}$, **d)** 1, **e)** 0, **f)** -1, **g)** $\dfrac{1}{2}$

h) $+\infty$, **i)** 1, **j)** 0, **k)** 1, **l)** $\log 5$, **m)** 0, **n)** $+\infty$,

o) $+\infty$, **p)** $\dfrac{1}{3}$, **q)** $-\infty$, **r)** $+\infty$, **s)** 0.