Esercitazione n. 06

I. Dopo averne accertata la regolarità, calcolare i seguenti limiti e verificare l'esattezza del risultato:

a) $\lim_{x\to 0}(2x-1)$

b) $\lim_{x\to 1}\frac{1}{(1-x)^2}$

c) $\lim_{x\to 0}-\frac{1}{arcsen^2 x}$

d) $\lim_{x\to +\infty}\left(\frac{1}{2}\right)^x$

e) $\lim_{x\to -\infty}2^x$

f) $\lim_{x\to +\infty}3^x$

g) $\lim_{x\to +\infty}\log_{2/3}x$

h) $\lim_{x\to -\infty}x^3$

i) $\lim_{x\to -\infty}4^{-x}$

j) $\lim_{x\to 0}e^{x+1}$

II. Calcolare i limiti significativi delle seguenti funzioni:

a) $f : X \to f(x)=\frac{\sqrt{x+2}}{x-1}$

b) $f : X \to f(x) = \dfrac{x-1}{\sqrt{x^2-4}}$

c) $f : X \to f(x) = \log_{1/2} \log_2 x \in R$

d) $f : X \to f(x) = \log_2 (x+2) \in R$

e) $f : X \to f(x) = 2^{x^2-1} - 3 \in R$

f) $f : X \to f(x) = \log_{1/5} (1 - 2^x) \in R$

g) $f : X \to f(x) = \log_2 \dfrac{x-1}{x+1} \in R$

h) $f : X \to f(x) = \log ar\cos \log_{1/4} (2^x - 1) \in R$

i) $f : X \to f(x) = arctg \log_{3/2} (3^x - 9) \in R$

j) $f : X \to f(x) = arcsen(2x-1) \in R$

k) $f : X \to f(x) = arcsen(2^x - 1) \in R$

l) $f : X \to f(x) = ar\cos(2 - \log_{1/2}(2x+1)) \in R$

m) $f : X \to f(x) = \sqrt{\dfrac{x^4 - 16}{3 + 2x - x^2}} \in R$

n) $f : X \to f(x) = \log_{1/2} (2senx - 1) \in R$

III. **Dopo averne accertata la regolarità, calcolare i seguenti limiti:**

a) $\lim\limits_{x \to 0} arcsen \dfrac{x^4 - 1}{x^2 + 1}$

b) $\lim\limits_{x \to -\infty} arc\cot g \left(\log_{\frac{2}{3}} e^{x-1} \right)$

c) $\lim\limits_{x \to -\infty} \sqrt{3x^2 - 3x + 1} - 2x$

d) $\lim_{x\to+\infty} \sqrt{3x^2-3x+1}-2x$

e) $\lim_{x\to+\infty} \sqrt{x^2+2x+3}-x$

f) $\lim_{x\to-\infty} \sqrt{x^2+2x+3}-x$

g) $\lim_{x\to-\infty} \frac{2\sqrt{x^2}-x}{2x^2-\sqrt[3]{x}+1}$

h) $\lim_{x\to-\infty} \sqrt{3x^3+3x+1}-2x$

i) $\lim_{x\to+\infty} \sqrt{3x^3+3x+1}-2x$

IV. Calcolare i seguenti limiti di cui alcuni, notevoli:

a) $\lim_{x\to+\infty} arctg\left(3^{\frac{1}{x}}-1\right)\cdot x$

b) $\lim_{x\to+\infty} arctg \log_{\frac{1}{2}} \frac{\sqrt{x}+1}{x+2}$

c) $\lim_{x\to+\infty} arc\cot g \log_3 \frac{x}{x^2-1}$

d) $\lim_{n} arctg\left(3^{\frac{1}{n}}-1\right)\cdot n$

e) $\lim_{n} arctg \log_{\frac{1}{2}} \frac{\sqrt{n}+1}{n+2}$

f) $\lim_{n} arc\cot g \log_3 \frac{n}{n^2-1}$

g) $\lim_{x\to0} \frac{\log_2\left(1+arctg\left(2^x-1\right)\right)}{arcsentg\,2x}$

h) $\lim_{x\to0} \frac{\log_{1/3}\left(1+x^3\right)+1-\left(\frac{1}{2}\right)^{x^3}}{1-\cos 2x^3}$

i) $\lim_{x\to 0} \frac{2^{x \operatorname{arctg} x} - 1 + \log_{1/2}\left(1 + x^2\right)}{\left(1 - \cos\left(2^{x^3} - 1\right)\right) \operatorname{sen} x}$

j) $\lim_{x\to 0} \frac{\sqrt{1 - \cos 3x} + \operatorname{arctg} 2x - \operatorname{tg}\left(2^{x^2} - 1\right)}{\operatorname{sen} \log\left(1 - 2x \operatorname{tg} x\right)}$

k) $\lim_{x\to \sqrt{2}} \frac{2x}{x^4 - 4}$

l) $\lim_{x\to +\infty} \frac{2 + \sqrt[3]{2x} + 2x^4}{3x - 2x^2 + \sqrt{x}}$