

Calcolo di limiti 3

Esercizio 1 (Teorema del confronto e conseguenze). Calcolare, se esistono, i seguenti limiti

- | | |
|---|---|
| a) $\lim_{x \rightarrow -\infty} \sqrt[3]{x} - 5 \cos x$ | $\lim_{x \rightarrow +\infty} \frac{\sqrt[4]{ \sin x }}{x}$ |
| b) $\lim_{x \rightarrow 0^+} (1 - \cos x) \sin\left(\frac{1}{x}\right)$ | $\lim_{x \rightarrow +\infty} 2^{-x} \sin(7x + 1)$ |
| c) $\lim_{x \rightarrow -\infty} 10^{ x } - \cos^2 x$ | $\lim_{x \rightarrow 0^+} (x + \sqrt{x}) \sin\left(\frac{1}{x}\right)$ |
| b) $\lim_{x \rightarrow -\infty} (x + \sin x)(x - \sin x)$ | $\lim_{x \rightarrow +\infty} \frac{x^2 + \sin x}{\arctan x}$ |
| e) $\lim_{x \rightarrow -\infty} \frac{3 - \cos x}{x + 3}$ | $\lim_{x \rightarrow -\infty} \frac{(\sin^2 x + 4 \cos x)(2x^3 - 3x)}{3x^4 - 2x + 1}$ |
| f) $\lim_{x \rightarrow +\infty} \frac{2^x + 2^{\sin x}}{2^x + \sin x}$ | $\lim_{x \rightarrow +\infty} \log x + \cos e^x$ |

Esercizio 2 (Confronto tra infiniti e infinitesimi). Calcolare, se esistono, i seguenti limiti

- | | | |
|---|--|---|
| a) $\lim_{x \rightarrow -\infty} \sqrt[3]{x} - 5\sqrt[5]{x^2}$ | $\lim_{x \rightarrow +\infty} \frac{x^3 + 2\sqrt{x}}{3x^2 - \sqrt{x}}$ | $\lim_{x \rightarrow 0^+} \frac{x^3 + 2\sqrt{x}}{3x^2 - \sqrt{x}}$ |
| b) $\lim_{x \rightarrow +\infty} 4^x - 3^x - 7^x$ | $\lim_{x \rightarrow +\infty} 2^{2x} - 2^x$ | $\lim_{x \rightarrow +\infty} x^3 - 3^x$ |
| c) $\lim_{x \rightarrow -\infty} (x^3 + 2)3^x$ | $\lim_{x \rightarrow 0} x^3 \log_3 x^2$ | $\lim_{x \rightarrow 0} x^3 + \log_3 x^2$ |
| d) $\lim_{x \rightarrow +\infty} \frac{x}{2 + e^x}$ | $\lim_{x \rightarrow +\infty} \frac{e^x}{2 + e^x}$ | $\lim_{x \rightarrow +\infty} \frac{x^{100}}{1 + 100^x}$ |
| e) $\lim_{x \rightarrow +\infty} \left(\frac{2}{3}\right)^x - x + 4x^5$ | $\lim_{x \rightarrow 0^+} \frac{x^2 - 2 \log x}{4x^2 + \log x}$ | $\lim_{x \rightarrow +\infty} \frac{x^2 - 2 \log x}{4x^2 + \log x}$ |
| f) $\lim_{x \rightarrow +\infty} \log(5x - 1) - \log(2x + 3)$ | | |
| g) $\lim_{x \rightarrow +\infty} \log(5x - 1) - 2 \log(2x + 3)$ | | |