

Esercitazione analisi 1

29/10/2025

Esercizio 1 Calcolare i seguenti limiti

a)

$$\lim_{n \rightarrow +\infty} \frac{8n^5 + 3n^{\frac{1}{2}} - 2n^{\frac{7}{3}}}{4n^{\frac{3}{4}} + \sqrt{n} + \sqrt{n^9}}$$

b)

$$\lim_{n \rightarrow +\infty} \frac{3^n - (\frac{3}{2})^n + (\frac{1}{3})^n}{(\frac{6}{5})^n + (\frac{7}{6})^n}$$

c)

$$\lim_{n \rightarrow +\infty} \frac{\ln(7^n) + 4^n - 4n^4}{7^n - 7n + \ln n^3}$$

d)

$$\lim_{n \rightarrow +\infty} \frac{1}{\ln(n^5) \sin \frac{1}{n}}$$

e)

$$\lim_{n \rightarrow +\infty} \sqrt[n]{\frac{2n^3}{5n^4 + 1}}$$

f)

$$\lim_{n \rightarrow +\infty} \frac{n^3 + \sin n - 3^n}{\log^3 n + 5n^n}$$

g)

$$\lim_{n \rightarrow +\infty} \left(n - \frac{5}{n}\right) \left(\sqrt{1 + \frac{5}{n}} - 1\right)$$

h)

$$\lim_{n \rightarrow +\infty} \frac{2}{n^3(1 - \cos \frac{\ln n}{n})}$$

i)

$$\lim_{n \rightarrow +\infty} \sqrt[n]{n \log n}$$

l)

$$\lim_{n \rightarrow +\infty} \frac{\sqrt{2n^3 - 3n^2 - 1} - \sqrt{2n^3 - 3n^2 + n}}{n - \sqrt{n^2 - n}}$$

m)

$$\lim_{n \rightarrow +\infty} \left(1 + \sin \frac{1}{n^3}\right)^{n^3}$$

Esercizio 2 Studiare al variare di $\alpha \in \mathbb{R}$ i seguenti limiti

1.

$$\frac{\sqrt{n^5 + 2n^3} - \sqrt{n^5 - 2n^3}}{n^\alpha + n}$$

2.

$$\lim_{n \rightarrow +\infty} \left(\alpha^2 + \frac{1}{2}\right)^n n^{\alpha - \frac{1}{4}}$$