

Argomento 3

Esercizi

Suggerimento generale

Ex. 3.1 Calcolare i seguenti limiti:

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|---|---|---|
| 1. $\lim_{x \rightarrow 3} (x^2 - 2x + 1)$ | 2. $\lim_{x \rightarrow 0} (\sqrt[3]{x^3 + 1} - \arctan x)$ | 3. $\lim_{x \rightarrow +\infty} (x^3 - 2)$ |
| 4. $\lim_{x \rightarrow 4} \frac{x^2 - 5x + 2}{x - 6}$ | 5. $\lim_{x \rightarrow +\infty} \sqrt{3x + 5}$ | 6. $\lim_{x \rightarrow 0} \frac{3x^2 - x + 2}{x + 3}$ |
| 7. $\lim_{x \rightarrow +\infty} e^{-x}$ | 8. $\lim_{x \rightarrow 0} x e^x$ | 9. $\lim_{x \rightarrow \frac{\pi}{2}^+} \tan x$ |
| 10. $\lim_{x \rightarrow 0^+} (\log x - x)$ | 11. $\lim_{x \rightarrow +\infty} \frac{\log x + x^2}{\arctan x}$ | 12. $\lim_{x \rightarrow 0} \cos x \cdot (x^2 + 3)$ |
| 13. $\lim_{x \rightarrow +\infty} (2^{-x} + \arctan x - x^4)$ | 14. $\lim_{x \rightarrow -\infty} 2^{3x+1}$ | 15. $\lim_{x \rightarrow 1} (3x + \sqrt{4x} - \log_5 x)$ |
| 16. $\lim_{x \rightarrow 0} (\tan x) e^x$ | 17. $\lim_{x \rightarrow 1^+} e^{\frac{1}{x-1}}$ | 18. $\lim_{x \rightarrow 1^-} e^{\frac{1}{x-1}}$ |
| 19. $\lim_{x \rightarrow +\infty} \left(\frac{1}{\log_2 x} + \log_{\frac{1}{2}} x \right)$ | 20. $\lim_{x \rightarrow 0} \log_3 \left(\frac{1}{x^2 + 9e^x} \right)$ | 21. $\lim_{x \rightarrow -\infty} \frac{3x + 2}{e^{2x} + 4}$ |
| 22. $\lim_{x \rightarrow -\infty} \left(2x^3 - \frac{1}{x + 2} \right)$ | 23. $\lim_{x \rightarrow +\infty} \frac{\sin\left(\frac{1}{x}\right)}{x}$ | 24. $\lim_{x \rightarrow +\infty} \frac{\log(e + e^{-x})}{1 - \frac{1}{x}}$ |
| 25. $\lim_{x \rightarrow 0^-} \frac{\cos x - 1}{\log(-x)}$ | 26. $\lim_{x \rightarrow +\infty} \sin\left(\arctan x + \frac{1}{x}\right)$ | 27. $\lim_{x \rightarrow +\infty} \frac{3^{\frac{1}{x}}}{\sqrt{x^2 - 2}}$ |

Argomento

Suggerimento

Soluzione

Ex. 3.2 Verificare se esistono i seguenti limiti e in tal caso calcolarli:

- | | | |
|--|---|---|
| 1. $\lim_{x \rightarrow 0} \frac{x^2 + 2x}{2x^5 - 5x^2}$ | 2. $\lim_{x \rightarrow 3^+} \frac{3x}{x - 3}$ | 3. $\lim_{x \rightarrow 0} \left(\frac{\cos x}{x^3} \right)^2$ |
| 4. $\lim_{x \rightarrow 2} \frac{x + 2}{x - 2}$ | 5. $\lim_{x \rightarrow 1^-} \frac{e^{x-1}}{x - 1}$ | 6. $\lim_{x \rightarrow 0^-} \frac{1}{\sqrt[3]{x^3 + x}}$ |

Argomento

Suggerimento

Soluzione

Ex. 3.3 Calcolare i seguenti limiti:

1. $\lim_{x \rightarrow +\infty} (x^2 + 1)^{x^3 - 1}$	2. $\lim_{x \rightarrow 1} \left(\frac{x^2 + 2x}{2x^3 - 1} \right)^{2x^2}$	3. $\lim_{x \rightarrow +\infty} (\log x)^{\arctan(x)}$
<i>Argomento</i>	<i>Suggerimento</i>	<i>Soluzione</i>

Ex. 3.4 Calcolare i seguenti limiti, usando, se occorre, il teorema del confronto:

1. $\lim_{x \rightarrow +\infty} \frac{1}{2x - \sin x}$	2. $\lim_{x \rightarrow +\infty} \frac{3}{5x - \cos x}$	3. $\lim_{x \rightarrow +\infty} x(7 + 3 \cos x)$
<i>Argomento</i>	<i>Suggerimento</i>	<i>Soluzione</i>

Ex. 3.5 (Esercizi facoltativi di riepilogo)

1. $\lim_{x \rightarrow 1} (x^3 - x + 4)$	2. $\lim_{x \rightarrow 2} \frac{2x^2 - x + 5}{x - 1}$	3. $\lim_{x \rightarrow 1} \frac{x^2 - \log x}{\arctan x}$
4. $\lim_{x \rightarrow +\infty} e^{\frac{1}{x}}$	5. $\lim_{x \rightarrow 1} \frac{x^2 - x + 1}{x - 1}$	6. $\lim_{x \rightarrow 0^+} \frac{e^x + 1}{\sin(-x)}$
7. $\lim_{x \rightarrow 0^-} \sqrt{\frac{x + 4}{1 - e^x}}$	8. $\lim_{x \rightarrow 0^+} \log \left(\sqrt{\frac{x^2 + 3x}{x + 5}} \right)$	9. $\lim_{x \rightarrow +\infty} \frac{\tan \left(\frac{1}{x} \right)}{x + 3}$
10. $\lim_{x \rightarrow +\infty} \arctan \left(\frac{e^{-x}}{x^2 + 1} \right)$	11. $\lim_{x \rightarrow 0} e^{\sin x} \cos(x + \pi)$	12. $\lim_{x \rightarrow +\infty} e^{\left(\frac{x^3 - 1}{x^{-2} + 2} \right)}$
13. $\lim_{x \rightarrow 1} \frac{\cos \left(\arctan \left(\frac{1}{x} \right) \right)}{e^{x-1}}$	14. $\lim_{x \rightarrow +\infty} \left(\frac{1}{2} \right)^{\frac{3-x-2}{x^3+1}}$	15. $\lim_{x \rightarrow +\infty} \frac{\log \left(1 + \frac{1}{x} \right)}{x^2 + e^x}$