

Corso di Laurea in Economia
Matematica per le applicazioni economiche e finanziarie

Esercizi – 5

Calcolo di limiti con la regola di De L'Hopital

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| 1. $\lim_{x \rightarrow 4} \frac{\sqrt[4]{x} - \sqrt{2}}{x - 4} = \frac{1}{8\sqrt{2}}$ | 2. $\lim_{x \rightarrow 0} \frac{\operatorname{tg} 5x + \operatorname{tg}^2 x}{\operatorname{tg} x} = 5$ |
| 3. $\lim_{x \rightarrow 0^+} \frac{e^x - \cos x - x}{2x^3} = +\infty$ | 4. $\lim_{x \rightarrow 0} \frac{\ln(1+x^2)}{\cos(3x) - e^{-x}} = 0$ |
| 5. $\lim_{x \rightarrow 0} \frac{\ln(1-x^2)}{x(3^x - 1)} = -\frac{1}{\ln 3}$ | 6. $\lim_{x \rightarrow 2} \frac{\ln(x^2 - 3)}{x^2 + 3x - 10} = \frac{4}{7}$ |
| 7. $\lim_{x \rightarrow \pi} \frac{2 \sin x + 2(\pi - x)}{1 - \cos(\pi - x)} = 0$ | 8. $\lim_{x \rightarrow +\infty} \frac{x + 5e^x}{\ln(1+x) + x^2} = +\infty$ |
| 9. $\lim_{x \rightarrow 0^+} x \ln x = 0$ | 10. $\lim_{x \rightarrow \frac{\pi}{2}} (\pi - 2x) \operatorname{tg} x = 2$ |
| 11. $\lim_{x \rightarrow 1} \left(\frac{x}{x-1} - \frac{1}{\ln x} \right) = \frac{1}{2}$ | 12. $\lim_{x \rightarrow 1} \left(\frac{1}{\ln x} - \frac{x}{\ln x} \right) = -1$ |
| 13. $\lim_{x \rightarrow 0} \left(\frac{1}{x} - \frac{1}{e^x - 1} \right) = \frac{1}{2}$ | 14. $\lim_{x \rightarrow 1} \left(1 + x^2 \right)^{\frac{1}{x}} = 1$ |
| 15. $\lim_{x \rightarrow 1} \left(1 + x^2 \right)^{\operatorname{tg} x} = 1$ | 16. $\lim_{x \rightarrow +\infty} x^{\frac{1}{x}} = 1$ |

Calcolo di limiti con le formule di Mac-Laurin

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| 1. $\lim_{x \rightarrow 0} \frac{e^{3x} - 1}{x + \sin x} = \frac{3}{2}$ | 2. $\lim_{x \rightarrow 0} \frac{e^{x^2} - 1}{\sin x} = 0$ |
| 3. $\lim_{x \rightarrow 0} \frac{x \sin x}{1 + \cos x - 2 \cos x^2} = -2$ | 4. $\lim_{x \rightarrow 0} \frac{\sin x + \cos x - 1}{x} = 1$ |
| 5. $\lim_{x \rightarrow 0} \frac{\ln(1+x) + 2x}{x + 3 \sin x} = \frac{3}{4}$ | 6. $\lim_{x \rightarrow 0} \frac{\ln(1-x) + \sin x}{\cos x - 1} = 1$ |
| 7. $\lim_{x \rightarrow 0} \frac{x - \ln(1+x)}{\cos x - 1} = -1$ | 8. $\lim_{x \rightarrow 0} \frac{e^x + e^{-x} - 2}{x^2} = 1$ |
| 9. $\lim_{x \rightarrow 0^+} \frac{e^x - \cos x - x}{2x^3} = +\infty$ | 10. $\lim_{x \rightarrow 0} \frac{\ln(1+x^2)}{\cos(3x) - e^{-x}} = 0$ |
| 11. $\lim_{x \rightarrow 0} \frac{e^{x^2} - 1}{x} = 0$ | 12. $\lim_{x \rightarrow 0} \frac{1 - \cos x}{e^x - 1 - x} = 1$ |
| 13. $\lim_{x \rightarrow 0^+} \frac{e^x + e^{-x} - 2}{x^2} = 1$ | 14. $\lim_{x \rightarrow 0} \frac{\ln(1-x^4)}{x^4} = -1$ |