

Esercizi su limiti di funzioni - 1

Calcolare i seguenti limiti di funzioni

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| 1. $\lim_{x \rightarrow 0^+} \frac{2x+1}{\sqrt{x}}$ | 8. $\lim_{x \rightarrow 1} \frac{x^3+5x-2}{ x-1 (x-2)}$ | 15. $\lim_{x \rightarrow 0^-} e^{-\frac{1}{x}}$ | 23. $\lim_{x \rightarrow 0} \frac{1-\cos(3x)}{\log(1+x^2)}$ |
| 2. $\lim_{x \rightarrow 0^+} \frac{x+x^3}{2x^2-\sqrt{x}}$ | 9. $\lim_{x \rightarrow +\infty} \frac{x^2+x+2}{x^3+1}$ | 16. $\lim_{x \rightarrow +\infty} \frac{2+\log x}{1-\log x}$ | 24. $\lim_{x \rightarrow 0} \frac{\log(1+\sin(x^4))}{(\cos(x)-1)^2}$ |
| 3. $\lim_{x \rightarrow 1^-} \frac{2-x^2}{x-1}$ | 10. $\lim_{x \rightarrow -\infty} \frac{x^4+x}{x^2-1}$ | 17. $\lim_{x \rightarrow 4} \frac{\sqrt{x}-2}{4-x}$ | 25. $\lim_{x \rightarrow 0} \frac{2\sqrt{x}}{\sqrt{1-x}-1}$ |
| 4. $\lim_{x \rightarrow 1^+} \frac{2-x^2}{x-1}$ | 11. $\lim_{x \rightarrow +\infty} \frac{x^2-x^{7/2}}{4x^3-5}$ | 18. $\lim_{x \rightarrow -\infty} x^5 \log x $ | 26. $\lim_{x \rightarrow 0} \frac{\sqrt{9+x}-3}{\sqrt[3]{1+x}-1}$ |
| 5. $\lim_{x \rightarrow 1} \frac{x^3-1}{x^2-1}$ | 12. $\lim_{x \rightarrow +\infty} \frac{3x+2}{\sqrt{2x^2+5}}$ | 19. $\lim_{x \rightarrow 0} \frac{\sin(2x)}{3x}$ | 27. $\lim_{x \rightarrow 0^+} \frac{\sqrt{\sinh(2x^3)}}{e^x-1}$ |
| 6. $\lim_{x \rightarrow 2} \frac{1}{\sqrt{x^2-4}}$ | 13. $\lim_{x \rightarrow -\infty} \frac{3x+2}{\sqrt{2x^2+5}}$ | 20. $\lim_{x \rightarrow 0} \frac{\sin x}{\sqrt{x}}$ | 28. $\lim_{x \rightarrow \pi} \frac{\sin x}{x-\pi}$ |
| 7. $\lim_{x \rightarrow 3} \frac{\sqrt{x^2-9}}{3-x}$ | 14. $\lim_{x \rightarrow 0^+} e^{-\frac{1}{x}}$ | 21. $\lim_{x \rightarrow 0} \frac{\sin(3x^2)}{x^4}$ | 29. $\lim_{x \rightarrow 1} \frac{2^x-2}{\log x}$ |
| | | 22. $\lim_{x \rightarrow 0} \frac{\tan(x^2+x)}{x^3-x}$ | |

In ciascuno dei seguenti casi, calcolare i limiti indicati per la funzione f data

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| 30. $f(x) = \frac{x^2+3x-2}{x-1}$ | $\lim_{x \rightarrow -\infty} f(x), \lim_{x \rightarrow 1^-} f(x), \lim_{x \rightarrow 1^+} f(x), \lim_{x \rightarrow +\infty} f(x)$ |
| 31. $f(x) = (x+1)\sqrt{\frac{x+3}{x-4}}$ | $\lim_{x \rightarrow -\infty} f(x), \lim_{x \rightarrow -3} f(x), \lim_{x \rightarrow 4} f(x), \lim_{x \rightarrow +\infty} f(x)$ |
| 32. $f(x) = \frac{(x-1)e^{1/x}}{\sqrt{x^2-3x+2}}$ | $\lim_{x \rightarrow -\infty} f(x), \lim_{x \rightarrow 0^+} f(x), \lim_{x \rightarrow 0^-} f(x), \lim_{x \rightarrow 1} f(x), \lim_{x \rightarrow 2} f(x), \lim_{x \rightarrow +\infty} f(x)$ |
| 33. $f(x) = \frac{x+e^x}{x^2+\log x-2 }$ | $\lim_{x \rightarrow -\infty} f(x), \lim_{x \rightarrow 0} f(x), \lim_{x \rightarrow 2} f(x), \lim_{x \rightarrow +\infty} f(x)$ |
| 34. $f(x) = \frac{x^2+\sin x}{\log(1+x)}$ | $\lim_{x \rightarrow -1} f(x), \lim_{x \rightarrow 0} f(x), \lim_{x \rightarrow +\infty} f(x)$ |
| 35. $f(x) = x \left(\sqrt{1+\frac{1}{x^2}} - 1 \right)$ | $\lim_{x \rightarrow -\infty} f(x), \lim_{x \rightarrow 0} f(x), \lim_{x \rightarrow +\infty} f(x)$ |

In ciascuno dei seguenti casi, stabilire se la funzione f è continua in \mathbb{R}

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| 36. $f(x) = \begin{cases} x+1 & \text{se } x < 3 \\ x^2-5 & \text{se } x \geq 3 \end{cases}$ | 38. $f(x) = \begin{cases} x-1 & \text{se } x \leq 2 \\ \cos(\pi x) & \text{se } x > 2 \end{cases}$ |
| 37. $f(x) = \begin{cases} x & \text{se } x \leq 1 \\ x^2-2 & \text{se } x > 1 \end{cases}$ | 39. $f(x) = \begin{cases} x^2+3x-1 & \text{se } x \leq 0 \\ \frac{\sin \sqrt{x}}{e^x-1} & \text{se } x > 0 \end{cases}$ |