

## Esercizi su limiti di funzioni - 1

Calcolare i seguenti limiti di funzioni

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.  $\lim_{x \rightarrow +\infty} \frac{x^2 - x^{7/2}}{4x^3 - 5}$

19.  $\lim_{x \rightarrow 0} \frac{\sin(2x)}{3x}$

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.  $\lim_{x \rightarrow +\infty} \frac{3x + 2}{\sqrt{2x^2 + 5}}$

20.  $\lim_{x \rightarrow 0} \frac{\sin x}{\sqrt{x}}$

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.  $\lim_{x \rightarrow -\infty} \frac{3x + 2}{\sqrt{2x^2 + 5}}$

21.  $\lim_{x \rightarrow 0} \frac{\sin(3x^2)}{x^4}$

28.  $\lim_{x \rightarrow \pi} \frac{\sin x}{x - \pi}$

7.  $\lim_{x \rightarrow 3} \frac{\sqrt{x^2 - 9}}{3 - x}$

14.  $\lim_{x \rightarrow 0^+} e^{-\frac{1}{x}}$

22.  $\lim_{x \rightarrow 0} \frac{\tan(x^2 + x)}{x^3 - x}$

29.  $\lim_{x \rightarrow 1} \frac{2^x - 2}{\log x}$

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

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  $\mathbb{R}$

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.  $f(x) = \begin{cases} x^2 + 3x - 1 & \text{se } x \leq 0 \\ \frac{\sin \sqrt{x}}{e^x - 1} & \text{se } x > 0 \end{cases}$