Esercizi sui Limiti Notevoli

Liceo Scientifico (Ordinamento / P.N.I.) – Classi V – Prof. Roberto Squellati

1. $\displaystyle\lim_{x\to\pi/4}\frac{\cos 2x}{\cos x-\cos\pi/4}$

2. $\displaystyle\lim_{x\to\alpha}\frac{\operatorname{sen}(x-\alpha)}{\cos^2 x-\cos^2\alpha}\qquad \alpha\neq k\frac{\pi}{2}\quad k\in\mathbb{Z}$

3. $\displaystyle\lim_{x\to+\infty}\frac{\ln\left(2+\frac{1}{x}\right)}{x}$

4. $\displaystyle\lim_{x\to+\infty}\frac{\ln(2x^2+3)}{\ln(x^3-1)}$

5. $\displaystyle\lim_{x\to+\infty}[\ln(1+e^x)-x]$

6. $\displaystyle\lim_{x\to+\infty}\left(\frac{2x+1}{2x+3}\right)^{x-1}$

7. $\displaystyle\lim_{x\to+\infty}(x+1)^{-1/\ln x}$

8. $\displaystyle\lim_{x\to 0}x^{1/\ln^2 x}$

9. $\displaystyle\lim_{x\to 0}\frac{(1+2x)^4-1}{x}$

10. $\displaystyle\lim_{x\to 1^+}\frac{e^{x-1}-1}{1-\cos(1-x)}$

11. $\displaystyle\lim_{x\to 0}\frac{1-\cos x}{\ln(1+\operatorname{tg}^2 x)}$

12. $\displaystyle\lim_{x\to 0}\frac{3^{\operatorname{sen} x}-1}{x}$

13. $\displaystyle\lim_{x\to -1}\frac{1-\cos(x^2-1)}{e^{x+1}-1}$

14. $\displaystyle\lim_{x\to+\infty}\frac{\operatorname{arctg} x-\pi/2}{x-\operatorname{sen} x}$

15. $\displaystyle\lim_{x\to-\infty}\left(x+1+\sqrt{3x^2-5x-1}\right)$

16. $\displaystyle\lim_{x\to+\infty}\left(\frac{x+1}{x-1}\right)^x$

17. $\displaystyle\lim_{x\to\pi/2}\frac{3\operatorname{sen}^2 x+\operatorname{sen} x-4}{\cos x}$

18. $\displaystyle\lim_{x\to\pi}\frac{\cos x+\cos 2x}{(x-\pi)^2}$

19. $\displaystyle\lim_{x\to\infty}\left(\frac{x}{x+1}\right)^{2x+1}$

20. $\displaystyle\lim_{x\to 0}\frac{\operatorname{sen} 3x\cdot(1-\cos x)}{x^2\operatorname{sen} kx}\qquad k\in\mathbb{R}-\{0\}$

21. $\displaystyle\lim_{x\to 0^+}\frac{\operatorname{sen}(x^2+x)}{x^2}$

22. $\displaystyle\lim_{x\to 0}\frac{(1+x^2-x)^{\sqrt{2}}-1}{x}$

23. $\displaystyle\lim_{x\to\infty}\left(\frac{3x-4}{3x+2}\right)^{\frac{x+1}{3}}$

24. $\displaystyle\lim_{x\to 1}\frac{\ln(7x-6)}{\ln(3x-2)}$

25. $\displaystyle\lim_{x\to 0}\frac{e^{2x}-e^x}{\ln(1+2x)}$

26. $\displaystyle\lim_{x\to 4}\frac{4^{x-1}-64}{2(x^2-3x-4)}$

27. $\displaystyle\lim_{x\to 1}\frac{x^3-3x+2}{x^4-4x+3}$

28. $\displaystyle\lim_{x\to+\infty}\frac{\sqrt{x}}{\sqrt{x+\sqrt{x+\sqrt{x}}}}$

29. $\displaystyle\lim_{x\to 0}\frac{\operatorname{sen} 5x}{\operatorname{sen} 2x}$

30. $\displaystyle\lim_{x\to 1}\frac{\operatorname{sen}\pi x}{\operatorname{sen} 3\pi x}$

31. $\displaystyle\lim_{x\to 0}\left(x\operatorname{sen}\frac{1}{x}\right)$

32. $\displaystyle\lim_{x\to 0^+}(\ln x-\ln\operatorname{sen} 2x)$

33. $\displaystyle\lim_{x\to 0}\left(\frac{\operatorname{sen} 2x}{x}\right)^{x+1}$

34. $\displaystyle\lim_{x\to 0^+}\left(\sqrt{x}\operatorname{sen}\ln x\right)$

35. $\displaystyle\lim_{x\to 0}\frac{1}{x}\left(2+\operatorname{sen}\frac{\pi}{x}\right)$

36. $\displaystyle\lim_{x\to\alpha}\frac{\operatorname{sen} x-\operatorname{sen}\alpha}{x-\alpha}$

37. $\displaystyle\lim_{x\to 0}\frac{x+\operatorname{sen} 3x}{x-\operatorname{sen} 2x}$

38. $\displaystyle\lim_{x\to\infty}\frac{x+\operatorname{sen} x}{x+\cos x}$

39. $\displaystyle\lim_{x\to+\infty}\frac{\ln^2 x+\sqrt[3]{\ln x}-4}{3\ln x-1}$

Soluzioni

1. $\left[2\sqrt{2}\right]$

2. $\left[-\dfrac{1}{\text{sen } 2\alpha}\right]$

3. $[0]$

4. $\left[\dfrac{2}{3}\right]$

5. $[0]$

6. $\left[\dfrac{1}{e}\right]$

7. $\left[\dfrac{1}{e}\right]$

8. $[1]$

9. $[8]$

10. $[+\infty]$

11. $\left[\dfrac{1}{2}\right]$

12. $[\ln 3]$

13. $[0]$

14. $[0]$

15. $[+\infty]$

16. $\left[e^2\right]$

17. $[0]$

18. $\left[-\dfrac{3}{2}\right]$

19. $\left[\dfrac{1}{e^2}\right]$

20. $\left[\dfrac{3}{2k}\right]$

21. $[+\infty]$

22. $\left[-\sqrt{2}\right]$

23. $\left[\dfrac{1}{e^{2/3}}\right]$

24. $\left[\dfrac{7}{3}\right]$

25. $\left[\dfrac{1}{2}\right]$

26. $\left[\dfrac{64}{5}\ln 2\right]$

27. $\left[\dfrac{1}{2}\right]$

28. $[1]$

29. $\left[\dfrac{5}{2}\right]$

30. $\left[\dfrac{1}{3}\right]$

31. $[0]$

32. $[-\ln 2]$

33. $[2]$

34. $[0]$

35. $[\infty]$

36. $[\cos\alpha]$

37. $[-4]$

38. $[1]$

39. $[0]$