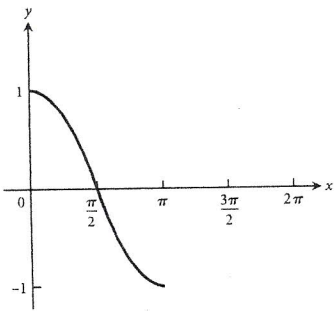


7.  $f(x) = \frac{1}{2} \cos x + \frac{1}{\pi} \sum_{n=2}^{\infty} \frac{n(1 + (-1)^n)}{n^2 - 1} \sin nx$



**Exercícios práticos**

- 1. Converge para 1    3. Converge para -1    5. Diverge
- 7. Converge para 0    9. Converge para 1    11. Converge para  $e^{-5}$
- 13. Converge para 3    15. Converge para  $\ln 2$     17. Diverge
- 19. 1/6    21. 3/2    23.  $e/(e-1)$     25. Diverge
- 27. Converge condicionalmente    29. Converge condicionalmente
- 31. Converge absolutamente    33. Converge absolutamente
- 35. Converge absolutamente    37. Converge absolutamente
- 39. Converge absolutamente
- 41. (a) 3,  $-7 \leq x < -1$     (b)  $-7 < x < -1$     (c)  $x = -7$
- 43. (a)  $1/3, 0 \leq x \leq 2/3$     (b)  $0 \leq x \leq 2/3$     (c) nenhum
- 45. (a)  $\infty$ , para qualquer valor de  $x$     (b) para qualquer valor de  $x$     (c) nenhum
- 47. (a)  $\sqrt{3}, -\sqrt{3} < x < \sqrt{3}$     (b)  $-\sqrt{3} < x < \sqrt{3}$     (c) nenhum
- 49. (a)  $e, -e < x < e$     (b)  $-e < x < e$     (c) conjunto vazio
- 51.  $\frac{1}{1+x}, \frac{1}{4}, \frac{1}{5}$     53.  $\sin x, \pi, 0$     55.  $e^x, \ln 2, 2$     57.  $\sum_{n=0}^{\infty} 2^n x^n$
- 59.  $\sum_{n=0}^{\infty} \frac{(-1)^n \pi^{2n+1} x^{2n+1}}{(2n+1)!}$     61.  $\sum_{n=0}^{\infty} \frac{(-1)^n x^{5n}}{(2n)!}$
- 63.  $\sum_{n=0}^{\infty} \frac{((\pi x)/2)^n}{n!}$
- 65.  $2 - \frac{(x+1)}{2 \cdot 1!} + \frac{3(x+1)^2}{2^3 \cdot 2!} + \frac{9(x+1)^3}{2^5 \cdot 3!} + \dots$
- 67.  $\frac{1}{4} - \frac{1}{4^2}(x-3) + \frac{1}{4^3}(x-3)^2 - \frac{1}{4^4}(x-3)^3$
- 69.  $y = \sum_{n=0}^{\infty} \frac{(-1)^{n+1}}{n!} x^n = -e^{-x}$
- 71.  $y = 3 \sum_{n=0}^{\infty} \frac{(-1)^n 2^n}{n!} x^n = 3e^{-2x}$
- 73.  $y = -1 - x + 2 \sum_{n=2}^{\infty} (x^n/n!) = 2e^x - 3x - 3$
- 75.  $y = 1 + x + 2 \sum_{n=0}^{\infty} (x^n/n!) = 2e^x - 1 - x$
- 77. 0,4849171431    79.  $\approx 0,4872223583$     81. 7/2

83. 1/12    85. -2    87.  $r = -3, s = 9/2$

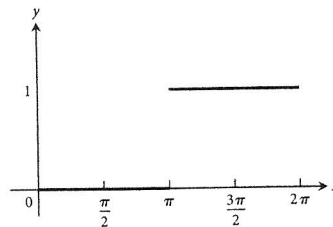
89. (b)  $|\text{erro}| < |\sin(1/42)| < 0,02381$ ; uma subestimação, já que o resto é positivo

91. 2/3    93.  $\ln\left(\frac{n+1}{2n}\right)$ ; a série converge para  $\ln\left(\frac{1}{2}\right)$

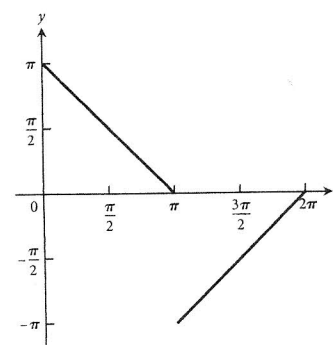
95. (a)  $\infty$     (b)  $a = 1, b = 0$

97. Converge

105.  $\frac{1}{2} - \sum_{n=1}^{\infty} \frac{2 \sin((2n-1)x)}{(2n-1)\pi}$



107.  $\sum_{n=1}^{\infty} \frac{4 \cos((2n-1)x)}{\pi(2n-1)^2} + \sum_{n=1}^{\infty} \frac{2 \sin((2n-1)x)}{2n-1}$



**Exercícios adicionais**

- 1. Converge; teste da comparação
- 3. Diverge; teste do  $n$ -ésimo termo
- 5. Converge; teste da comparação    7. Diverge; teste do  $n$ -ésimo termo
- 9. Com  $a = \pi/3, \cos x = \frac{1}{2} - \frac{\sqrt{3}}{2}(x - \pi/3) - \frac{1}{4}(x - \pi/3)^2 + \frac{\sqrt{3}}{12}(x - \pi/3)^3 + \dots$
- 11. Com  $a = 0, e^x = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \dots$
- 13. Com  $a = 22\pi, \cos x = 1 - \frac{1}{2}(x - 22\pi)^2 + \frac{1}{4!}(x - 22\pi)^4 - \frac{1}{6!}(x - 22\pi)^6 + \dots$
- 15. Converge, limite =  $b$     17.  $\pi/2$     23.  $b = \pm \frac{1}{5}$
- 25.  $a = 2, L = -7/6$     29. (b) Sim
- 35. (a)  $\sum_{n=1}^{\infty} nx^{n-1}$     (b) 6    (c)  $1/q$
- 37. (a)  $R_n = C_0 e^{-kt_0} (1 - e^{-nkt_0}) / (1 - e^{-kt_0})$ ,  
 $R = C_0 (e^{-kt_0}) / (1 - e^{-kt_0}) = C_0 / (e^{kt_0} - 1)$   
 (b)  $R_1 = 1/e \approx 0,368$ ,  
 $R_{10} = R(1 - e^{-10}) \approx R(0,9999546) \approx 0,58195$ ;  
 $R \approx 0,58198; 0 < (R - R_{10})/R < 0,0001$   
 (c) 7