Aula 11

11 Dia 11: Limites - calculando via leis

Alguns limites fundamentais e variações

- 1º Limite Fundamental:
$$\lim_{x\to 0}\frac{\operatorname{sen} x}{x}=1$$
- 2º Limite Fundamental:
$$\lim_{x\to+\infty}\left(1+\frac{1}{x}\right)^{x}=\mathrm{e}$$
- 3º Limite Fundamental:
$$\lim_{x\to 0}\frac{a^{x}-1}{x}=\ln a$$
- $\lim_{x\to 0}\dfrac{\ln(1+x)}{x}=1$
- $\lim_{x\to 0}\dfrac{\mathrm{e}^{x}-1}{x}=1$
- $\lim_{x\to 0}\dfrac{1-\cos(x)}{x^{2}}=\dfrac{1}{2}$

Exercício 11.1. Calcule cada um dos limites abaixo.

(a) $\lim_{x\to 0}\dfrac{\sin(3x)}{x}=$

(b) $\lim_{x\to 0}\dfrac{\sin(5x)}{\sin(2x)}=$

(c) $\lim_{x\to 0}\dfrac{\tan(x)}{x}=$

(d) $\lim_{x\to 0}\dfrac{\sin(x^{2})}{x^{2}}=$

(e) $\lim_{x\to 0}\dfrac{\sin(x)}{x^{3}}=$

(f) $\lim_{x\to+\infty}\left(1+\dfrac{2}{x}\right)^{x}=$

(g) $\lim_{x\to+\infty}\left(1-\dfrac{1}{x}\right)^{x}=$

(h) $\lim_{x\to+\infty}x\left(\dfrac{1}{x+1}-\dfrac{1}{x}\right)=$

(i) $\lim_{x\to 0}\dfrac{\ln(1-x)}{x}=$

(j) $\lim_{x\to 0}\dfrac{\mathrm{e}^{2x}-1}{x}=$

(k) $\lim_{x\to 0}\dfrac{4^{4x}-1}{\operatorname{sen} x}=$

(l) $\lim_{x\to 0}\dfrac{x-\sin(x)}{x^{3}}=$

(m) $\lim_{x\to 0}\dfrac{x-\tan(x)}{x^{3}}=$

(n) $\lim_{x\to 0}\dfrac{x^{2}-\ln(1+x^{2})}{x^{4}}=$

(o) $\lim_{x\to 0}\dfrac{\ln(\cos(x))}{x^{2}}=$

(p) $\lim_{x\to 0}\dfrac{\mathrm{e}^{x^{2}}-1}{x^{2}}=$

(q) $\lim_{x\to+\infty}\left(1+\dfrac{1}{x}\right)^{x+1}=$

(r) $\lim_{x\to+\infty}\left(\dfrac{x}{x+1}\right)^{x}=$

(s) $\lim_{x\to 0}\dfrac{2^{x}-3^{x}}{x}=$

(t) $\lim_{x\to 0}\dfrac{(\sin(x))^{2}}{x^{2}}=$