

1ra. parte

Exercício 1

$$1. \lim_{x \rightarrow \frac{1}{2}} \frac{8x^3 - 1}{6x^2 - 5x + 1} = 6$$

$$2. \lim_{x \rightarrow 3} \frac{\sqrt{x^2 + 7} - 4}{x^2 - 5x + 6} = \frac{3}{4}$$

$$3. \lim_{x \rightarrow \frac{1}{2}} \frac{\sqrt[4]{2x-1}}{\sqrt{2x-1}} = 0$$

$$4. \lim_{x \rightarrow 2} \frac{\sqrt{x^2 + 12} - 4}{2 - \sqrt{x^3 - 4}} = -\frac{1}{6}$$

$$5. \lim_{x \rightarrow 1} \frac{\sin(3x^2 - 5x + 2)}{x^2 + x - 2} = \frac{1}{3}$$

$$6. \lim_{x \rightarrow 0} \frac{\tan(x)}{x} = 1$$

$$7. \lim_{x \rightarrow 0} \frac{\sin(\sin(x))}{x} = 1$$

$$8. \lim_{x \rightarrow \frac{\pi}{4}} \frac{\sin(x) - \cos(x)}{1 - \tan(x)} = -\frac{1}{\sqrt{2}}$$

$$9. \lim_{x \rightarrow 0} \frac{\sin^3(x) \sin(\frac{1}{x})}{x^2} = 0$$

$$10. \lim_{x \rightarrow 0^+} \frac{\sin(x)}{x^2 - x^3} = +\infty$$

$$11. \lim_{x \rightarrow 0} \frac{1 - \sqrt[3]{\cos x}}{x^2} = \frac{1}{6}$$

$$12. \lim_{x \rightarrow 1} \left(\frac{1}{x-1} - \frac{3}{1-x^3} \right) = \frac{2}{3}$$

$$13. \lim_{x \rightarrow 1} \frac{x-1}{|x-1|} = \frac{2}{3}$$

$$14. \lim_{x \rightarrow 1^+} \frac{x-1}{|x-1|} = 1$$

$$15. \lim_{x \rightarrow 5} \frac{x+1}{(5-x)^3} = \frac{2}{3}$$

$$16. \lim_{x \rightarrow 5^+} \frac{x+1}{(5-x)^3} = -\infty$$

$$17. \lim_{x \rightarrow +\infty} (\sqrt{x^2 + 16} + x + 4) = +\infty$$

$$18. \lim_{x \rightarrow -\infty} (\sqrt[3]{x+1} - \sqrt[3]{x}) = 0$$

$$19. \lim_{x \rightarrow +\infty} (\sqrt{x+1} - \sqrt{x}) = 0$$

$$20. \lim_{x \rightarrow +\infty} \frac{3x^3 + x \cos x^3}{\sqrt{x^3 \sin \frac{1}{x} + 1}} = +\infty$$

$$21. \lim_{x \rightarrow +\infty} \frac{\sqrt[4]{8x^{16} + 3x^4 + x}}{3x^4 + 5} = \frac{\sqrt[4]{8}}{3}$$

$$22. \lim_{x \rightarrow +\infty} \frac{x - \sin x}{x + \sin x} = 1$$

$$23. \lim_{x \rightarrow +\infty} (\sqrt{x^2 - 1} - \sqrt{x^4 + 1}) = -\infty$$

$$24. \lim_{x \rightarrow +\infty} (\sqrt{x + \sqrt{x}} - \sqrt{x}) = \frac{1}{2}$$

$$25. \lim_{x \rightarrow +\infty} (x - \sqrt[3]{2 + 3x^3}) = -\infty$$

$$26. \lim_{x \rightarrow p} \frac{\sin x - \sin p}{x - p} = \cos p$$

$$27. \lim_{x \rightarrow p} \frac{\cos x - \cos p}{x - p} = -\sin p$$

$$28. \lim_{x \rightarrow p} \frac{\tan x - \tan p}{x - p} = \sec^2 p$$

Exercício 2: 0

Exercício 3: 0

Exercício 4: $+\infty$

Exercício 5: $\lim_{x \rightarrow 0} f(x) = 0$ e $\lim_{x \rightarrow 0} (f(x) \cos(\frac{1}{x+x^2})) = 0$

Exercício 6: 1

Exercício 7: a) 3 b) 0 c) 2 d) $\frac{7}{3}$

Exercício 8: $\lim_{x \rightarrow +\infty} \frac{x^3 + 3x - 1}{2x^3 - 6x + 1} = \frac{1}{2}$

Exercício 10: $c = -1, L = \frac{5}{2}$

Exercício 11: $a = 15$, o limite é -1

Exercício 13: $\lim_{x \rightarrow 0^+} \frac{|x|}{x} = 1$ e $\lim_{x \rightarrow 0^-} \frac{|x|}{x} = -1$

Exercício 14: a) $\lim_{x \rightarrow 0} x^2 \sin(\frac{1}{x^2}) = 0$ b) $\lim_{x \rightarrow 0} \sqrt[3]{x} 2^{\sin(\frac{1}{x^2})} = 0$

Exercício 15: 0

2da. parte

Exercício 2: a) não existe L b) $L = \frac{3}{7}$ c) $L = -\cos 2$

Exercício 4: $c = \frac{1}{3}$

Exercício 5: a) $\mathbb{R} \setminus \{-1\}$ b) $\mathbb{R} \setminus \{3\}$ c) $\mathbb{R} \setminus \{1\}$ d) \mathbb{R}