ACH2011 - Cálculo I

Sistema de Informação - EACH

Encontre o limite.

a) $\lim_{x\to\infty} \dfrac{3x+5}{x-4}$.

b) $\lim_{x\to-\infty} \dfrac{x^2+6x}{2x^3-3x^2+7}$,

c) $\lim_{x\to-\infty} \dfrac{x+x^3+x^5}{1-x^2+x^4}$.

Resposta:

a) $\lim_{x\to\infty} \dfrac{3x+5}{x-4}$. $= \lim_{x\to+\infty} \dfrac{\frac{1}{x}(3x+5)}{\frac{1}{x}(x-4)} = \lim_{x\to+\infty} \dfrac{\frac{3\cancel{x}}{\cancel{x}} + \frac{5}{x}}{\frac{\cancel{x}}{\cancel{x}} - \frac{4}{x}} = \lim_{x\to+\infty} \dfrac{3+\frac{5}{x}}{1-\frac{4}{x}}$

$= \dfrac{\lim_{x\to+\infty} 3+\frac{5}{x}}{\lim_{x\to+\infty} 1-\frac{4}{x}} = \dfrac{3+0}{1-0} = 3$

b) $\lim_{x\to-\infty} \dfrac{x^2+6x}{2x^3-3x^2+7}$, $= \lim_{x\to-\infty} \dfrac{\frac{1}{x^3}(x^2+6x)}{\frac{1}{x^3}(2x^3-3x^2+7)} = \lim_{x\to-\infty} \dfrac{\frac{x^2}{x^3}+\frac{6x}{x^3}}{\frac{2x^3}{x^3}-\frac{3x^2}{x^3}+\frac{7}{x^3}}$

$= \lim_{x\to-\infty} \dfrac{\frac{1}{x}+\frac{6}{x^2}}{\underbrace{2-\frac{3}{x}+\frac{7}{x^3}}_{\to 2}} = \dfrac{0+0}{2} = 0$

c) $\lim\limits_{x\to-\infty} \dfrac{x+x^3+x^5}{1-x^2+\underline{x^4}}$. $= \lim\limits_{x\to-\infty} \dfrac{\frac{1}{x^4}(x+x^3+x^5)}{\frac{1}{x^4}(1-x^2+x^4)} = \lim\limits_{x\to-\infty} \dfrac{\frac{\cancel{x}}{x^{4}_{3}}+\frac{\cancel{x^3}}{x^4}+\frac{x^{\cancel{5}}}{\cancel{x^4}}}{\frac{1}{x^4}-\frac{\cancel{x^2}}{x^{4}_{2}}+\underset{1}{\frac{\cancel{x^4}}{\cancel{x^4}}}}$

$= \lim\limits_{x\to-\infty} \dfrac{\frac{1}{x^3}+\frac{1}{x}+x}{\underbrace{\frac{1}{x^4}-\frac{1}{x^2}+1}_{\to 1}} = -\infty$