



COLEGIO SEMINARIO DIOCESANO DUITAMA
TECNOLOGÍA E INFORMÁTICA

DOCENTE: Fausto Mauricio Lagos

GRADO:1101

ESTUDIANTE: Cristian Nikolas Morales

FECHA: 10/06/2021

PERIODO: Segundo

Find the limit of each rational function **a)** as $x \rightarrow \infty$ and **b)** as $x \rightarrow -\infty$. (Hass et al., 2018, p. 94)

$$\begin{aligned} a) \lim_{x \rightarrow \infty} \frac{5x^8 - 2x^3 + 9}{3 + x - 4x^5} &= \lim_{x \rightarrow \infty} \frac{x^5 \left(5x^3 - \frac{2}{x^2} + \frac{9}{x^5} \right)}{x^5 \left(\frac{3}{x^5} + \frac{1}{x^4} - 4 \right)} \\ &= \lim_{x \rightarrow \infty} \frac{5x^3 - \frac{2}{x^2} + \frac{9}{x^5}}{\frac{3}{x^5} + \frac{1}{x^4} - 4} \\ &= \lim_{x \rightarrow \infty} \frac{5\infty^3 - \frac{2}{\infty^2} + \frac{9}{\infty^5}}{\frac{3}{\infty^5} + \frac{1}{\infty^4} - 4} \\ &= \frac{\infty}{-4} \\ &= -\infty \end{aligned}$$

$$\begin{aligned} b) \lim_{x \rightarrow -\infty} \frac{5x^8 - 2x^3 + 9}{3 + x - 4x^5} &= \lim_{x \rightarrow -\infty} \frac{x^5 \left(5x^3 - \frac{2}{x^2} + \frac{9}{x^5} \right)}{x^5 \left(\frac{3}{x^5} + \frac{1}{x^4} - 4 \right)} \\ &= \lim_{x \rightarrow -\infty} \frac{5x^3 - \frac{2}{x^2} + \frac{9}{x^5}}{\frac{3}{x^5} + \frac{1}{x^4} - 4} \\ &= \lim_{x \rightarrow -\infty} \frac{5(-\infty)^3 - \frac{2}{(-\infty)^2} + \frac{9}{(-\infty)^5}}{\frac{3}{(-\infty)^5} + \frac{1}{(-\infty)^4} - 4} \\ &= \frac{-\infty}{-4} \\ &= \infty \end{aligned}$$

Referencia:

Hass, J., Heil, C., & Weir, M. D. (Eds.). (2018). *Thomas' calculus* (Fourteenth edition). Pearson.

Enlace al documento fuente:

https://docs.google.com/document/d/1hFWv5H_wF19v4qYedfF-J1NGWXwepNPNPY7UgxHPDPY/edit