

Problema 1 Calcular los siguientes límites:

$$1. \lim_{x \rightarrow \infty} \frac{5x^4 - 2x^3 + 7x - 7}{8x^4 - 9x + 5}$$

$$2. \lim_{x \rightarrow \infty} \frac{4x^2 - 3x + 9}{7x^3 - 8x^2 + x + 1}$$

$$3. \lim_{x \rightarrow \infty} \frac{-6x^4 - 8x^3 + 5x - 1}{5x^2 - x - 2}$$

$$4. \lim_{x \rightarrow \infty} \left(\frac{5x^2 + 6x - 12}{2x^2 - 3x + 1} \right)^{9x+11}$$

$$5. \lim_{x \rightarrow \infty} \left(\frac{2x^2 + 7x - 3}{5x^2 + x + 2} \right)^{\frac{9x+4}{10}}$$

$$6. \lim_{x \rightarrow \infty} \left(\frac{2x - 7}{2x + 1} \right)^{x+2}$$

Solución:

$$1. \lim_{x \rightarrow \infty} \frac{5x^4 - 2x^3 + 7x - 7}{8x^4 - 9x + 5} = \frac{5}{8}$$

$$2. \lim_{x \rightarrow \infty} \frac{4x^2 - 3x + 9}{7x^3 - 8x^2 + x + 1} = 0$$

$$3. \lim_{x \rightarrow \infty} \frac{-6x^4 - 8x^3 + 5x - 1}{5x^2 - x - 2} = -\infty$$

$$4. \lim_{x \rightarrow \infty} \left(\frac{5x^2 + 6x - 12}{2x^2 - 3x + 1} \right)^{9x+11} = \infty$$

$$5. \lim_{x \rightarrow \infty} \left(\frac{2x^2 + 7x - 3}{5x^2 + x + 2} \right)^{\frac{9x+4}{10}} = 0$$

$$6. \lim_{x \rightarrow \infty} \left(\frac{2x - 7}{2x + 1} \right)^{x+2} = e^{-4}$$

Problema 2 Calcular los siguientes límites:

$$1. \lim_{x \rightarrow \infty} \frac{\sqrt{7x^2 + 3x - 1}}{3x + 2}$$

2. $\lim_{x \rightarrow \infty} \frac{-2x^3 + x + 5}{\sqrt{3x + 5}}$
3. $\lim_{x \rightarrow \infty} \sqrt{\frac{7x^2 - 2x + 1}{x^2 - 8x + 3}}$
4. $\lim_{x \rightarrow \infty} \frac{\sqrt{5x^2 - 2x + 1}}{5x^2 - 2}$
5. $\lim_{x \rightarrow \infty} (\sqrt{3x^2 + x + 2} - \sqrt{3x^2 - x - 1})$
6. Sabiendo que $\lim_{x \rightarrow \infty} \left(\frac{2x + 3}{2x - 1} \right)^{2nx} = 3$, calcular n .

Solución:

1. $\lim_{x \rightarrow \infty} \frac{\sqrt{7x^2 + 3x - 1}}{3x + 2} = \frac{\sqrt{7}}{3}$
2. $\lim_{x \rightarrow \infty} \frac{-2x^3 + x + 5}{\sqrt{3x + 5}} = -\infty$
3. $\lim_{x \rightarrow \infty} \sqrt{\frac{7x^2 - 2x + 1}{x^2 - 8x + 3}} = \sqrt{7}$
4. $\lim_{x \rightarrow \infty} \frac{\sqrt{5x^2 - 2x + 1}}{5x^2 - 2} = 0$
5. $\lim_{x \rightarrow \infty} (\sqrt{3x^2 + x + 2} - \sqrt{3x^2 - x - 1}) = \frac{\sqrt{3}}{3}$
6. $\lim_{x \rightarrow \infty} \left(\frac{2x + 3}{2x - 1} \right)^{2nx} = 3 \implies n = \frac{\ln 3}{4} = 0,2746530721$.

Problema 3 Calcular los siguientes límites:

1. $\lim_{x \rightarrow 2} \frac{x^4 - 2x^3 + 5x^2 - 8x - 4}{5x^3 - 8x^2 - 5x + 2}$
2. $\lim_{x \rightarrow 1} \frac{4x^4 + 2x^3 - 5x^2 + 2x - 3}{3x^3 + x^2 - 5x + 1}$
3. $\lim_{x \rightarrow 2} \frac{\sqrt{3x^2 + 4} - \sqrt{7x + 2}}{x - 2}$

Solución:

1. $\lim_{x \rightarrow 2} \frac{x^4 - 2x^3 + 5x^2 - 8x - 4}{5x^3 - 8x^2 - 5x + 2} = \frac{20}{23}$

$$2. \lim_{x \rightarrow 1} \frac{4x^4 + 2x^3 - 5x^2 + 2x - 3}{3x^3 + x^2 - 5x + 1} = \frac{7}{3}$$

$$3. \lim_{x \rightarrow 2} \frac{\sqrt{3x^2 + 4} - \sqrt{7x + 2}}{x - 2} = \frac{5}{8}$$

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