

**Examen de Matemáticas 1º de Bachillerato CS**  
**Octubre 2015**

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**Problema 1** Calcular los siguientes límites:

1.  $\lim_{x \rightarrow \infty} (-7x^4 + 2x^3 + 5x^2 - x + 1)$
2.  $\lim_{x \rightarrow \infty} \frac{3x^4 - 5x^2 + 2x + 3}{7x^5 - 2x + 1}$
3.  $\lim_{x \rightarrow \infty} \frac{\sqrt{7x^4 + 5x^2 - 3x + 3}}{-2x^2 + 5}$
4.  $\lim_{x \rightarrow \infty} \left( \sqrt{5x^2 - 2x + 1} - \sqrt{5x^2 + 4x - 1} \right)$
5.  $\lim_{x \rightarrow 1} \frac{9x^4 - 5x^2 - 3x - 1}{4x^5 - 5x + 1}$
6.  $\lim_{x \rightarrow 2} \frac{3x^4 - 8x^2 - 9x + 2}{x^4 - 9x + 2}$
7.  $\lim_{x \rightarrow 9} \frac{\sqrt{x^2 + 2} - \sqrt{8x + 11}}{x - 9}$
8.  $\lim_{x \rightarrow 5} \frac{\sqrt{2x^2 - 1} - \sqrt{8x + 9}}{x - 5}$
9.  $\lim_{x \rightarrow \infty} \left( \frac{x^2 - 5x + 1}{x^2 - 1} \right)^{3x}$
10.  $\lim_{x \rightarrow \infty} \left( \frac{3x^2 - 7x + 8}{7x^2 + 4} \right)^{x^2 + 7}$
11.  $\lim_{x \rightarrow \infty} \frac{\sqrt{5x^2 - 6x + 3}}{-3x + 8}$
12.  $\lim_{x \rightarrow \infty} \frac{\sqrt{-9x^7 - x + 5}}{x^2 - 2}$
13.  $\lim_{x \rightarrow 0} \frac{2x^5 - 3x^2 + x}{5x}$
14.  $\lim_{x \rightarrow \infty} \frac{\sqrt[3]{-3x^6 + 4x - 1}}{2x^2 + 3}$
15.  $\lim_{x \rightarrow \infty} \left( \sqrt{3x^2 - 8x + 1} + \sqrt{3x^2 - 3x + 5} \right)$

**Solución:**

1.  $\lim_{x \rightarrow \infty} (-7x^4 + 2x^3 + 5x^2 - x + 1) = -\infty$
2.  $\lim_{x \rightarrow \infty} \frac{3x^4 - 5x^2 + 2x + 3}{7x^5 - 2x + 1} = 0$
3.  $\lim_{x \rightarrow \infty} \frac{\sqrt{7x^4 + 5x^2 - 3x + 3}}{-2x^2 + 5} = -\frac{\sqrt{7}}{2}$
4.  $\lim_{x \rightarrow \infty} \left( \sqrt{5x^2 - 2x + 1} - \sqrt{5x^2 + 4x - 1} \right) = -\frac{3\sqrt{5}}{5}$
5.  $\lim_{x \rightarrow 1} \frac{9x^4 - 5x^2 - 3x - 1}{4x^5 - 5x + 1} = \frac{23}{15}$
6.  $\lim_{x \rightarrow 2} \frac{3x^4 - 8x^2 - 9x + 2}{x^4 - 9x + 2} = \frac{55}{23}$
7.  $\lim_{x \rightarrow 9} \frac{\sqrt{x^2 + 2} - \sqrt{8x + 11}}{x - 9} = \frac{5\sqrt{83}}{83}$
8.  $\lim_{x \rightarrow 5} \frac{\sqrt{2x^2 - 1} - \sqrt{8x + 9}}{x - 5} = \frac{6}{7}$
9.  $\lim_{x \rightarrow \infty} \left( \frac{x^2 - 5x + 1}{x^2 - 1} \right)^{3x} = e^{-15}$
10.  $\lim_{x \rightarrow \infty} \left( \frac{3x^2 - 7x + 8}{7x^2 + 4} \right)^{x^2 + 7} = 0$
11.  $\lim_{x \rightarrow \infty} \frac{\sqrt{5x^2 - 6x + 3}}{-3x + 8} = -\frac{\sqrt{5}}{3}$
12.  $\lim_{x \rightarrow \infty} \frac{\sqrt{-9x^7 - x + 5}}{x^2 - 2}$  No existe
13.  $\lim_{x \rightarrow 0} \frac{2x^5 - 3x^2 + x}{5x} = \frac{1}{5}$
14.  $\lim_{x \rightarrow \infty} \frac{\sqrt[3]{-3x^6 + 4x - 1}}{2x^2 + 3} = -\frac{\sqrt[3]{3}}{2}$
15.  $\lim_{x \rightarrow \infty} \left( \sqrt{3x^2 - 8x + 1} + \sqrt{3x^2 - 3x + 5} \right) = \infty$