Lista 12

a) $\lim_{x \to +\infty} (3x^2 - 5x + 2) = \lim_{x \to +\infty} 3x^2 = 3.(+\infty)^2 = 3.(+\infty) = +\infty$

b) $\lim_{x \to -\infty} \left(\frac{-4x^3 + 7x}{2x^2 - 3x - 10}\right) = \lim_{x \to -\infty} \left(\frac{-4x^3}{2x^2}\right) = \lim_{x \to -\infty} (-2x) = -2(-\infty) = +\infty$

c) $\lim_{x \to -\infty} \left(\frac{11x + 2}{2x^3 - 1}\right) = \lim_{x \to -\infty} \left(\frac{11x}{2x^3}\right) = \lim_{x \to -\infty} \left(\frac{11}{2x^2}\right) = \frac{11}{2.(-\infty)^2} = \frac{11}{\infty} = 0$

d) $\lim_{x \to -\infty} \left(\frac{1 - 12x^3}{4x^2 + 12}\right) = \lim_{x \to -\infty} \left(\frac{12x^3}{4x^2}\right) = \lim_{x \to -\infty} \left(\frac{12x}{4}\right) = \frac{12x}{4} = 3x = 3.(-\infty) = -\infty$

e) $\lim_{x \to +\infty} \left(\frac{\sqrt{x^4 + 2x - 1}}{2x^2 - 1}\right) = \sqrt{\lim_{x \to +\infty} \frac{x^4 + 2x - 1}{2x^2 - 1}} = \lim \frac{x^4}{2x^2} = \sqrt{\frac{x^2}{2}} = \frac{x}{\sqrt{2}} = \frac{\infty}{\sqrt{2}} = \infty$

f) $\lim_{x \to \infty} \left(\sqrt{x^2 + x + 1} - \sqrt{x^2 - x + 1}\right) = \lim_{x \to \infty} \left(\frac{x^2 + x + 1 - x^2 + x - 1}{\sqrt{x^2 + x + 1} + \sqrt{x^2 - x + 1}}\right)$

$\lim_{x \to \infty} \left(\frac{2x}{\sqrt{x^2 + x + 1} + \sqrt{x^2 - x + 1}}\right) = \lim_{x \to \infty} \left(\frac{2x}{\sqrt{\frac{x^2}{x^2} + \frac{x}{x^2} + \frac{1}{x^2}} + \sqrt{\frac{x^2}{x^2} - \frac{x}{x^2} + \frac{1}{x^2}}}\right) = \lim_{x \to \infty} \frac{2x}{\sqrt{1} + \sqrt{1}}$

$\lim_{x \to \infty} \frac{2x}{2} = x = +\infty$

g) $\lim_{x \to \infty} \frac{2x + 5}{\sqrt{2x^2 - 5}} = \frac{\frac{2x + 5}{x}}{\frac{\sqrt{2x^2 - 5}}{x}} = \frac{2 + \frac{5}{x}}{\sqrt{\frac{2x^2}{x^2} - \frac{5}{x^2}}} = \frac{2 + \frac{5}{x}}{\sqrt{2 - \frac{5}{x^2}}} = \frac{2}{\sqrt{2}} = \sqrt{2}$

h) $\lim_{x \to \infty} -\sqrt{\frac{1 - x^2}{x^2 + x}} = -\sqrt{\lim_{x \to \infty} \frac{1 - x^2}{x^2 + x}} = \lim_{x \to \infty} -\sqrt{\frac{x^2}{x^2}} = -\sqrt{-1}$

i) $\lim_{x \to -\infty} \frac{1}{1 - x} = \frac{1}{1 - (-\infty)} = \frac{1}{\infty} = 0$

j) $\lim_{x \to \infty} \sqrt{\frac{x + 1}{x - 1}} = \sqrt{\lim_{x \to \infty} \frac{x + 1}{x - 1}} = \lim \frac{x}{x} = \sqrt{1} = 1$