# Exercises 1.1

**Exercise 1.-** Compute next limits of rational functions:

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

b) $\lim_{x\to+\infty} \dfrac{3x^2+5x-4}{4x^2+2x+7}$

c) $\lim_{x\to+\infty} \dfrac{15x^2-3x+9}{x^3+x^2+x+1}$

d) $\lim_{x\to-\infty} \dfrac{-3x+9}{x^2+2x+1}$

e) $\lim_{x\to-\infty} \dfrac{2x+9}{5x-2}$

**Exercise 2.-** Compute:

a) $\lim_{x\to+\infty} \left(\sqrt{4x^2+1}-2x\right)$

b) $\lim_{x\to+\infty} \left(\sqrt{x^2+4x}-x\right)$

**Exercise 3.-** Compute:

a) $\lim_{x\to2} \dfrac{3x^2-4x}{x+1}$

b) $\lim_{x\to2} \dfrac{x^2-2x}{x+1}$

c) $\lim_{x\to2} \dfrac{x^2+3x-10}{x^2-4x+4}$

d) $\lim_{x\to-2} \dfrac{x^3+3x^2-4x-12}{x^2-4}$

**Exercise 4.-** Compute:

a) $\lim_{x\to2} \left(\dfrac{x+1}{x+3}\right)^{\frac{x^2-1}{x-1}}$

b) $\lim_{x\to2} \left(\dfrac{2x+1}{2x-3}\right)^{\frac{x^2-1}{(x-2)^2}}$

c) $\lim_{x\to2} \left(\dfrac{x+1}{2x+3}\right)^{\frac{x^2-1}{(x-2)^2}}$

d) $\lim_{x\to+\infty} \left(\dfrac{x^2+1}{x^2+4}\right)^{x+1}$

**Exercise 5.-** Compute:

a) $\lim_{x\to 0} \dfrac{6x}{sen2x}$

b) $\lim_{x\to 0} \dfrac{sen5x}{sen2x}$

c) $\lim_{x\to 1} \dfrac{tg(x^2-1)}{x-1}$

d) $\lim_{x\to 0} \dfrac{Ln(\cos x)}{x^2}$

e) $\lim_{x\to 0} \dfrac{sen5x}{Ln(1+4x)}$

f) $\lim_{x\to +\infty} \dfrac{sen\left(\dfrac{1}{x}\right)}{1-cos\left(\dfrac{5}{\sqrt{x}}\right)}$

g) $\lim_{x\to 1/2} \dfrac{Ln(4x-1)}{2x-1}$

h) $\lim_{x\to 0} \dfrac{Ln(2x^2+1)}{2x}$

i) $\lim_{x\to 0} \dfrac{Ln(1+sen4x)}{e^{sen5x}-1}$

**Exercise 6.-** Using tools explained previously, compute next limits :

a) $\lim_{x\to 0} \dfrac{x^3-3x^2}{x^2-x}$

b) $\lim_{x\to -\infty} \dfrac{7x^2+1}{x^2-1}$

c) $\lim_{x\to 4} \dfrac{x^2-8x+16}{x^2-5x+4}$

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

e) $\lim_{x\to +\infty} \left(\dfrac{2x+3}{2x+1}\right)^{x+1}$

f) $\lim_{x\to +\infty} Ln\left(\dfrac{x^2-2x+1}{2x+7}\right)$

g) $\lim_{x\to 0} \dfrac{\sqrt{1+x^2}-1}{1-cosx}$

h) $\lim_{x\to 0} \dfrac{\sqrt{1+x}-1}{senx}$