Ćwiczenia 5. Twierdzenie de l'Hospitala. Wyznaczanie asymptot funkcji.

Zad.1. Oblicz granice:

$$\frac{e^x-1}{sin(2x)}$$
$$\frac{1-cosx}{x^2}$$
$$\frac{e^{3x}}{x^2}$$
$$\frac{lnx}{x}$$
$$\lim_{x\to 0}\frac{x-arctgx}{x^3}$$
$$\lim_{x\to\frac{\pi}{6}}\frac{1-2sinx}{cos(3x)}$$
$$\lim_{x\to 0}(1-e^{2x})ctgx$$
$$\lim_{x\to 1}\frac{lnx}{1-x^3}$$
$$\lim_{x\to 0}(e^{2x}+x)^{\frac{1}{x}}$$
$$\lim_{x\to 0}(1-e^{2x})ctgx$$
$$\frac{ln(sin(3x))}{ln(sin(4x))}$$
$$\frac{\sqrt{x}}{arcsin(2x)}$$
$$x^x$$
$$(sinx)^{\sqrt{x}}$$

$$\frac{x-1}{lnx}$$
$$\frac{x-sinx}{x^3}$$
$$\frac{tgx-sinx}{x-sinx}$$
$$\frac{tgx}{tg(3x)}$$
$$\lim_{x\to\frac{\pi}{4}}\frac{1-tgx}{cos(2x)}$$
$$\lim_{x\to 0}\frac{e^{2x}-1}{ln(1+2x)}$$
$$\lim_{x\to 0}\left(\frac{1}{xsinx}-\frac{1}{x^2}\right)$$
$$\lim_{x\to 1}x^{\frac{1}{1-x}}$$
$$\lim_{x\to 0}\frac{e^x-e^{-x}}{sinx}$$
$$\lim_{x\to\infty}\frac{ln(lnx)}{x}$$
$$xlnx$$
$$\frac{lnx}{ctgx}$$
$$(arcsinx)^{2x}$$
$$(1-x)\,ln(1-x)$$

Zad.2. Wyznacz asymptoty funkcji f:

$$f(x)=\frac{x^2}{x-1}$$
$$f(x)=\frac{x+1}{x^2-4x+3}$$
$$f(x)=\sqrt{x^2-4}$$
$$f(x)=xe^{\frac{1}{x}}-x$$
$$f(x)=ln(1-x^2)$$
$$f(x)=\frac{3x^2+1}{|x|+2}$$

$$f(x)=\frac{x^3}{x^2-1}$$
$$f(x)=\frac{2x^2-4x}{x^2-4}$$
$$f(x)=xarctg\frac{1}{x}$$
$$f(x)=lnx-arctgx$$
$$f(x)=\left(x+\frac{1}{x+2}\right)arcctgx$$
$$f(x)=\frac{4x^2-1}{|x+1|+1}$$

$$f(x) = \frac{\sqrt{x^2 + 9}}{x + 3}$$

$$f(x) = \frac{x\sqrt{x^2 + 1}}{x + 2}$$

$$f(x) = \sqrt{4x^2 - x}$$

$$f(x) = \{\frac{6x^2}{|x| - 1} \quad , |x|$$

$$\geq 2 \ \frac{1}{\sqrt{x^2 - 4}} \quad , |x| < 2$$