

Ćwiczenia 2. Dziedzina funkcji, granica funkcji oraz ciągłość funkcji.

Zad.1. Wyznacz dziedzinę funkcji f określonej wzorem:

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

$$f(x) = \arccos(2x - 5)$$

$$f(x) = \sqrt[3]{\frac{x-1}{x^4-16}}$$

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

$$f(x) = \frac{\sqrt{\log(9-x^2)}}{2^x-1}$$

$$f(x) = \frac{\sqrt{9-x^2}}{\log_x \sin(2x)}$$

$$f(x) = \ln x + \ln^2 x + \ln^3 x + \dots$$

$$f(x) = \ln(x^3 - 3x^2 + 3x - 9)$$

$$f(x) = e^{tgx-1} + 2x$$

$$f(x) = \frac{2x+1}{\cos^2 x - \sin^2 x}$$

$$f(x) = \arcsin|2x+1|$$

$$f(x) = \frac{\sqrt{5x-x^2}}{2 - \log_{2x-1}(5x-4)}$$

$$f(x) = x + 2x^2 + 4x^3 + \dots$$

$$f(x) + (f(x))^2 + (f(x))^3 + \dots = e^{-x}$$

Zad.2. Oblicz granice:

$$\lim_{x \rightarrow 2} \frac{2x+1}{3x-5}$$

$$\lim_{x \rightarrow 1} \frac{x-2}{x^2-3x+2}$$

$$\lim_{x \rightarrow 2} \frac{x^2-4}{8-x^3}$$

$$\lim_{x \rightarrow 2} \frac{x-4}{\sqrt{x}-2}$$

$$\lim_{x \rightarrow 1} \frac{x^5-1}{x-1}$$

$$\lim_{x \rightarrow 0} \frac{\sin x}{3x}$$

$$\lim_{x \rightarrow 0} \frac{\sin(2x)}{\sin(3x)}$$

$$\lim_{x \rightarrow 0} \frac{2tgx}{x}$$

$$\lim_{x \rightarrow 0} \frac{1+\cos x}{\sin^2 x}$$

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

$$\lim_{x \rightarrow 1} \frac{x^2+x-2}{x^2+3x-4}$$

$$\lim_{x \rightarrow 2} \frac{x^2-2x-3}{x^2-9}$$

$$\lim_{x \rightarrow -\frac{1}{2}} \frac{4x^2-1}{2x+1}$$

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

$$\lim_{x \rightarrow 0} \frac{x}{2\sin x}$$

$$\lim_{x \rightarrow 0} \frac{\sin^2(5x)}{3x^2}$$

$$\lim_{x \rightarrow 0} tg(3x)ctg(2x)$$

$$\lim_{x \rightarrow 1} \frac{1-x}{x^2-1}$$

$$\lim_{x \rightarrow 1} \frac{2}{x-1}$$

$$\lim_{x \rightarrow -1} \frac{1}{(x+1)^2}$$

$$\lim_{x \rightarrow -2} \frac{x^2 + x - 2}{x^3 + 4x^2 + 4x}$$

$$\lim_{x \rightarrow \infty} \frac{2x^2 + x - 2}{3x^2 + 4x}$$

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

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

$$\lim_{x \rightarrow \infty} \left(\sqrt{1-x} - \sqrt{x} \right)$$

$$\lim_{x \rightarrow \infty} \left(1 + \frac{2}{x} \right)^{3x}$$

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

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

$$\lim_{x \rightarrow \infty} \left(1 + \frac{1}{x} \right)^{\sqrt{x}}$$

$$\lim_{x \rightarrow 0} \operatorname{arctg} \frac{1}{x}$$

$$\lim_{x \rightarrow \infty} \operatorname{arcsin} \frac{x}{x+1}$$

$$\lim_{x \rightarrow -2} \frac{2x+1}{x+2}$$

$$\lim_{x \rightarrow 1} \frac{x^3 + x - 2}{(x-1)^2}$$

$$\lim_{x \rightarrow 1} e^{\frac{1}{1-x}}$$

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

$$\lim_{x \rightarrow -\infty} \frac{2x^3 - 3}{3x^2 - x^3}$$

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

$$\lim_{x \rightarrow \infty} \left(\sqrt{x^2 + 3x - 1} - x \right)$$

$$\lim_{x \rightarrow \infty} \left(1 - \frac{5}{2x} \right)^x$$

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

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

$$\lim_{x \rightarrow \infty} \left(\frac{x-1}{x+2} \right)^{3x}$$

$$\lim_{x \rightarrow 1} \operatorname{arcctg} \frac{1}{(x-1)^2}$$

$$\lim_{x \rightarrow \infty} \operatorname{arccos} \sqrt{\frac{3x^2}{2x+4x^2}}$$