

Задачи за самоподготовка

Пресметнете границите:

$$\lim_{n \rightarrow +\infty} \frac{\sqrt{n^2+1}-n}{\sqrt{n^2-1}-n}$$

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

$$\lim_{n \rightarrow +\infty} \frac{12n^3-n+2}{5n^3-2n+1}$$

$$\lim_{x \rightarrow 1} \frac{\sqrt{8x+1}-3}{x-1};$$

$$\lim_{x \rightarrow 0} \frac{\sin 3x}{\sin 5x};$$

$$\lim_{x \rightarrow \infty} \left(\frac{x^2-1}{x^2-7x+12} \right)^x;$$

$$\lim_{x \rightarrow 0} \frac{e^x - e^{-x}}{x};$$

$$\lim_{x \rightarrow 0} \frac{1 - \cos x}{3x^2};$$

$$\lim_{n \rightarrow \infty} \left(\frac{x^2-5x+6}{x^2-25} \right)^{2x};$$

$$\lim_{x \rightarrow \infty} (\sqrt{3x^2+3x-1} - \sqrt{3x^2+4});$$

$$\lim_{x \rightarrow \infty} \left(\frac{x^2+3x+2}{x^2-4} \right)^x;$$

$$\lim_{x \rightarrow \infty} (\sqrt{x^2+x-10} - \sqrt{x^2+4});$$

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

$$\lim_{x \rightarrow 3} \frac{\sqrt{8x+1}-5}{x^2-9};$$

$$\lim_{x \rightarrow 0} \frac{x^2-2x}{\sqrt{x+1}-1};$$

$$\lim_{x \rightarrow 0} (\sin x)^{\sin x};$$

$$\lim_{x \rightarrow 1} \ln x \ln(1-x)$$

$$\lim_{x \rightarrow 0} (\sin x)^{\lg x};$$

$$\lim_{x \rightarrow \infty} \left(\frac{2}{\pi} \arctg x \right)^x;$$

$$\lim_{x \rightarrow 2} \arcsin \frac{x-2}{2} \cot g(x-2)$$

$$\lim_{x \rightarrow 0} \frac{x^2 \cos x}{\cos x - 1};$$

$$\lim_{x \rightarrow 4} \frac{x^2-8x}{\sqrt{x^2+x+5}-5};$$

$$\lim_{x \rightarrow 3} \frac{\sqrt{x+6}-3}{x^2-7x+12};$$

$$\lim_{x \rightarrow \infty} \frac{x + \sin x}{x - \sin x}$$

Намерете интервалите на растене намаляване, локалните екстремуми, интервалите на изпъкналост и вдлъбнатост на функциите:

$$f(x) = x^3 - 12x^2;$$

$$f(x) = 3x - x^3;$$

$$f(x) = \frac{x}{3} + \frac{3}{x};$$

$$f(x) = \frac{x^2+x-19}{x-4};$$

$$f(x) = \frac{x^2}{x-1};$$

$$f(x) = \frac{x^2+x-5}{x-2};$$

$$f(x) = \frac{x^2-7x+6}{x-10}$$

$$f(x) = x^3 + 3x^2 + 6x + 7$$

$$f(x) = x \ln x$$