

Tema 3

1. Calculați limitele:

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

b) $\lim_{x \rightarrow 0} \frac{\operatorname{tg} 3x}{\sin 2x}$

c) $\lim_{x \rightarrow 0} \frac{\operatorname{arc} \sin 3x}{x}$

d) $\lim_{x \rightarrow 0} \frac{\operatorname{arctg} 2x}{\sin 3x}$

e) $\lim_{x \rightarrow \pi} \frac{\sin 3x}{\sin 2x}$

f) $\lim_{x \rightarrow 1} \frac{1-x^2}{\sin(\pi x)}$

g) $\lim_{x \rightarrow 0} \frac{\ln(1+x^2)}{\sin^2(3x)}$

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

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

j) $\lim_{x \rightarrow 0} \frac{\sin 5x - \sin 3x}{5x}$

k) $\lim_{x \rightarrow 0} \frac{\sqrt[n]{1+x} - \sqrt[n]{1-x}}{x}$

l) $\lim_{x \rightarrow \pi} \frac{\sin x}{1 - \frac{x^2}{\pi^2}}$

2. Să se determine valoarea constantei α pentru ca funcțiile să fie continue:

$$g(x) = \begin{cases} \frac{6 \sin(\alpha(x-1))}{x-1}, & 0 \leq x < 1 \\ -\alpha + 5x, & 1 \leq x \leq 2 \end{cases} \quad R: \frac{5}{7}$$

$$f(x) = \begin{cases} \sqrt{\alpha^2 - 2\alpha x + x^2}, & 1 \leq x < 2 \\ \alpha x + 3, & 2 \leq x < 3 \end{cases} \quad R: -\frac{1}{3}$$

$$h(x) = \begin{cases} \frac{\sqrt{x-2}-1}{x-3}, & 2 \leq x < 3 \\ \frac{\alpha x}{9} + \frac{1}{3}, & 3 \leq x \leq 4 \end{cases} \quad R: \frac{1}{2}$$