

## RJEŠENJA 2. ŠKOLSKE ZADAĆE IZ MATEMATIKE1

13.11.2006. grupe 1,3,5

A grupa

$$1. \lim_{n \rightarrow \infty} \left( \frac{3n+7}{8n-2} \right)^{5n} = \lim_{n \rightarrow \infty} \left( \frac{3}{8} \right)^{5n} \cdot \left( \frac{n+\frac{7}{3}}{n-\frac{1}{4}} \right)^{5n} = \lim_{n \rightarrow \infty} \left( \frac{3}{8} \right)^{5n} \cdot \left( 1 + \frac{1}{\frac{12n-3}{31}} \right)^{\frac{12n-3}{31} \cdot \frac{31}{12n-3} \cdot 5n}$$

$$= 0 \cdot e^{\frac{31 \cdot 5}{12}} = 0.$$

$$2. \lim_{n \rightarrow \infty} (\sqrt{x^4+2x^2}-\sqrt{x^4+1}) \cdot \frac{\sqrt{x^4+2x^2}+\sqrt{x^4+1}}{\sqrt{x^4+2x^2}+\sqrt{x^4+1}} = \lim_{n \rightarrow \infty} \frac{x^4+2x^2-x^4-1}{\sqrt{x^4+2x^2}+\sqrt{x^4+1}}$$

$$= \lim_{n \rightarrow \infty} \frac{2x^2-1}{\sqrt{x^4+2x^2}+\sqrt{x^4+1}} \Big/ : x^2 = \lim_{n \rightarrow \infty} \frac{2-\frac{1}{x^2}}{\sqrt{1+\frac{2}{x^2}}+\sqrt{1+\frac{1}{x^4}}} = \frac{2}{1+1} = 1.$$

$$3. \lim_{n \rightarrow -\infty} \arcsin e^{\frac{1}{x}} = \arcsin \left( \lim_{n \rightarrow -\infty} e^{\frac{1}{x}} \right) = \arcsin e^0 = \arcsin 1 = \frac{\pi}{2}.$$

$$4. 2 = f(0) = \lim_{x \rightarrow 0} f(x) = \lim_{x \rightarrow 0} \frac{\sin ax}{3x} = \lim_{x \rightarrow 0} \frac{\sin ax}{ax} \cdot \frac{a}{3} = 1 \cdot \frac{a}{3} = \frac{a}{3} \Rightarrow a = 6.$$

B grupa

$$1. \lim_{n \rightarrow \infty} \frac{2^n + 3 \cdot 5^n}{3^n - 4^n} = \lim_{n \rightarrow \infty} \frac{2^n + 3 \cdot 5^n}{4^n \left( \left( \frac{3}{4} \right)^n - 1 \right)} \Big/ : 5^n = \lim_{n \rightarrow \infty} \frac{2^n + 3 \cdot 5^n}{3^n - 4^n} = \lim_{n \rightarrow \infty} \frac{\left( \frac{2}{5} \right)^n + 3}{\left( \frac{4}{5} \right)^n \cdot \left( \left( \frac{3}{4} \right)^n - 1 \right)}$$

$$= \frac{0+3}{0 \cdot (0-1)} = -\infty.$$

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

$$3. \lim_{x \rightarrow 3^+} th \frac{3}{x^2-9} = th \left( \lim_{x \rightarrow 3^+} \frac{3}{x^2-9} \right) = th(+\infty) = 1,$$

$$\lim_{x \rightarrow 3^-} th \frac{3}{x^2-9} = th \left( \lim_{x \rightarrow 3^-} \frac{3}{x^2-9} \right) = th(-\infty) = -1 \Rightarrow \text{LIMES NE POSTOJI!}$$

$$4. a = f(0) = \lim_{x \rightarrow 0} e^{-\frac{1}{x^2}} = \lim_{x \rightarrow 0} \frac{1}{e^{\frac{1}{x^2}}} = \frac{1}{e^\infty} = 0.$$