# Domaći rad - granična vrednost - Sara Milošević

**1219. a)**

$$\lim_{n\to\infty}\frac{(n+1)^3-(n-1)^3}{(n+1)^2+(n-1)^2}=$$

$$\lim_{n\to\infty}\frac{n^3+3n^2+3n+1-(n^3-3n^2+3n-1)}{n^2+2n+1+n^2-2n+1}=$$

$$\lim_{n\to\infty}\frac{n^3+3n^2+3n+1-n^3+3n^2-3n+1}{2n^2+2}=$$

$$\lim_{n\to\infty}\frac{6n^2+2}{2n^2+2}=\lim_{n\to\infty}\frac{2(3n^2+1)}{2(n^2+1)}=\lim_{n\to\infty}\frac{3n^2+1\ /:n^2}{n^2+1\ /:n^2}=$$

$$\lim_{n\to\infty}\frac{3+\frac{1}{n^2}}{1+\frac{1}{n^2}}=\frac{3+0}{1+0}=3$$

**1219. v)**

$$\lim_{n\to\infty}\left(\frac{2n^2}{2n+3}+\frac{1-3n^3}{3n^2+1}\right)=$$

$$\lim_{n\to\infty}\left(\frac{2n^2\cdot(3n^2+1)+(1-3n^3)\cdot(2n+3)}{(2n+3)(3n^2+1)}\right.=$$

$$\lim_{n\to\infty}\frac{6n^4+2n^2+2n+3-6n^4-9n^3}{6n^3+2n+9n^2+3}=$$

$$\lim_{n\to\infty}\frac{-9n^3+2n^2+2n+3\ /:n^3}{6n^3+9n^2+2n+3\ /:n^3}=$$

$$\lim_{n\to\infty}\frac{-9+2\cdot\frac{1}{n}+2\cdot\frac{1}{n^2}+3\cdot\frac{1}{n^3}}{6+9\cdot\frac{1}{n}+2\cdot\frac{1}{n^2}+3\cdot\frac{1}{n^3}}=\frac{-9+2\cdot0+2\cdot0+3\cdot0}{6+9\cdot0+2\cdot0+3\cdot0}=-\frac{3}{2}$$

**1220. b)**

$$\lim_{n\to\infty}\frac{(n+2)!-(n+1)!}{(n+3)!}=\lim_{n\to\infty}\frac{(n+2)(n+1)!-(n+1)!}{(n+3)(n+2)(n+1)!}=$$

$$\lim_{n\to\infty}\frac{(n+1)!\cdot(n+2-1)}{(n+3)(n+2)(n+1)!}=\lim_{n\to\infty}\frac{n+1}{n^2+3n+2n+6}=$$

$$\lim_{n\to\infty}\frac{n+1\ /:n^2}{n^2+5n+6\ /:n^2}=\lim_{n\to\infty}\frac{\frac{1}{n}+\frac{1}{n^2}}{1+5\frac{1}{n}+6\frac{1}{n^2}}=$$

$$\frac{0+0}{1+5\cdot 0+6\cdot 0}=0$$

**1222. đ)**

$$\lim_{n\to\infty}\left(\frac{\overbrace{1+5+9+\cdots+(4n-3)}^{S_n}}{2(n+1)}-n\right)$$

$$S_n=\frac{n}{2}\cdot(a_1+a_n)=\frac{n}{2}\cdot(1+4n-3)=\frac{n}{2}\cdot(4n-2)=$$

$$=\frac{2n\cdot(2n-1)}{2}=n\cdot(2n-1)=2n^2-n$$

$$\lim_{n\to\infty}\frac{2n^2-n-2n\cdot(n+1)}{2\cdot(n+1)}=\lim_{n\to\infty}\frac{2n^2-n-2n^2-2n}{2n+2}=$$

$$\lim_{n\to\infty}\frac{-3n\ /:n}{2n+2\ /:n}=\lim_{n\to\infty}\frac{-3}{2+2\frac{1}{n}}=\frac{-3}{2+2\cdot 0}=-\frac{3}{2}$$