DOMAĆI

1210. a)

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

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

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

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

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

v)

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

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

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

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

$$\lim_{n\to\infty}\frac{1}{n}=0$$

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

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

1211. b)

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

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

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

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

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

$$=\lim_{n\to\infty}\frac{\frac{1}{n}+\frac{1}{n^2}}{1+5\cdot\frac{1}{n}+6\cdot\frac{1}{n^2}}=0$$

$$\lim_{n\to\infty}\frac{1}{n}=0$$

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

1213. đ)

$$\lim_{n\to\infty}\frac{(1+5+9+\cdots+(4n-3)}{2(n+1)}-n=$$

$$S_n=\frac{n}{2}(a_1+a_n)-suma\ aritmetičkog\ niza$$

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

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

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

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

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

$$\lim_{n \to \infty} \frac{1}{n} = 0$$