Gomilište i limes niza realnih brojeva

Matematika 2

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FOI, Varaždin

Sadržaj

prvi zadatak

Zadatak 1

Odredite gomilišta sljedećih nizova:

a) $a_n = (-1)^n \cdot 2 + \dfrac{1}{n}$

b) $b_n = 1 + \sin \dfrac{n\pi}{2}$

c) $c_n = \begin{cases} \dfrac{1}{n}, & \textit{ako je } n \textit{ paran} \\ \sqrt{n}, & \textit{ako je } n \textit{ neparan} \end{cases}$

d) $d_n = \begin{cases} p + \dfrac{1}{p^k}, & \textit{ako je } n = p^k \textit{ za neki prosti broj } p \textit{ i neki } k \in \mathbb{N} \\ n, & \textit{inače} \end{cases}$

Jesu li zadani nizovi konvergentni?

Rješenje

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Rješenje

Podniz konvergentnog niza je konvergentni niz s istim limesom. Za $n = 2k$ vrijedi

$$\lim_{k\to\infty}\left(2+\frac{1}{2k}\right) = 2.$$

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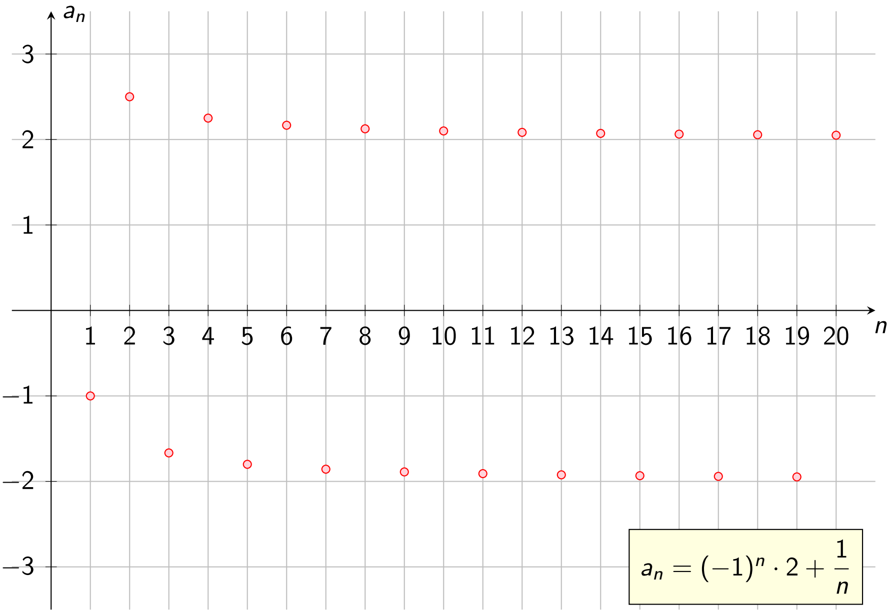
- Niz (a_n) nije konvergentan jer ima više od jednog gomilišta.


a_n
n
3
2
1
−1
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$$b_n = \begin{cases} 1, & \text{ako je } n = 2k \text{ za neki } k \in \mathbb{N} \\ 2, & \text{ako je } n = 4k-3 \text{ za neki } k \in \mathbb{N} \\ & \end{cases}$$

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$(b_n) \rightsquigarrow 2,\ 1,\ 0,\ 1,\ 2,\ 1,\ 0,\ 1,\ 2,\ 1,\ 0,\ 1, \ldots$

$$2,\ 1,\ 0,\ 1,\ 2,\ 1,\ 0,\ 1,\ 2,\ 1,\ 0,\ 1, \ldots$$

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$$2,\ \underline{\underline{1}},\ 0,\ \underline{\underline{1}},\ 2,\ \underline{\underline{1}},\ 0,\ \underline{\underline{1}},\ 2,\ \underline{\underline{1}},\ 0,\ \underline{\underline{1}},\dots$$

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$$2,\ 1,\ \underline{\underline{0}},\ 1,\ 2,\ 1,\ \underline{\underline{0}},\ 1,\ 2,\ 1,\ \underline{\underline{0}},\ 1,\dots$$

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- Broj 0 je gomilište niza (b_n) jer svaka okolina tog broja sadrži beskonačno mnogo članova tog niza koji se nalaze na pozicijama s indeksima oblika $4k-1$ za $k \in \mathbb{N}$,

$$2,\ 1,\ \underline{\underline{0}},\ 1,\ 2,\ 1,\ \underline{\underline{0}},\ 1,\ 2,\ 1,\ \underline{\underline{0}},\ 1, \ldots$$

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$$2,\ 1,\ 0,\ 1,\ 2,\ 1,\ 0,\ 1,\ 2,\ 1,\ 0,\ 1,\ldots$$

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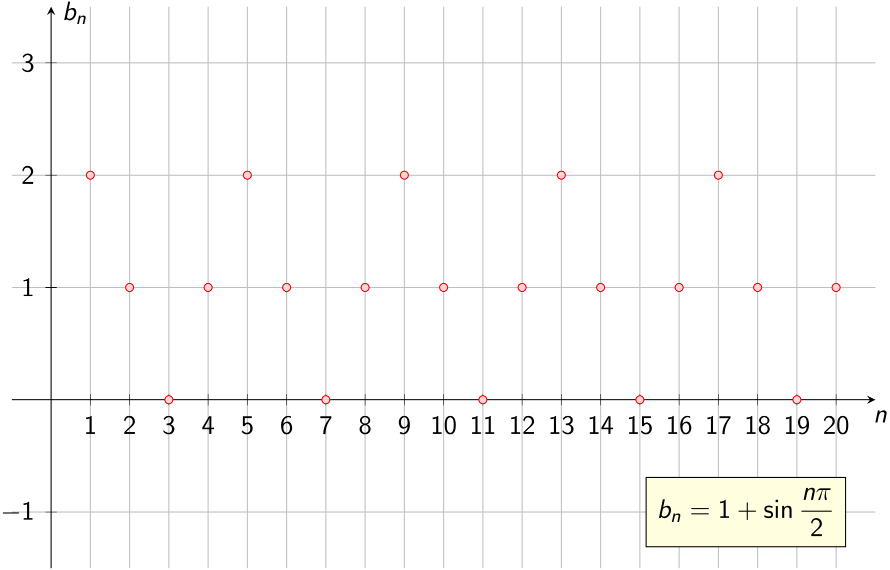
b_n
3
2
1
−1
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
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- Broj 0 je gomilište niza (c_n) jer svaka okolina tog broja sadrži beskonačno mnogo članova tog niza koji se nalaze na parnim pozicijama, tj. podniz $(c_{2k})_{k\in\mathbb{N}}$ konvergira broju 0.

c)

$$1,\ \frac{1}{2},\ \sqrt{3},\ \frac{1}{4},\ \sqrt{5},\ \frac{1}{6},\ \sqrt{7},\ \frac{1}{8},\ 3,\ \frac{1}{10},\ldots \qquad c_n = \begin{cases} \dfrac{1}{n}, & \text{ako je } n \text{ paran} \\ \sqrt{n}, & \text{ako je } n \text{ neparan} \end{cases}$$

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- Niz (c_n) ima samo jedno gomilište, ali ipak nije konvergentan.

c)

$$1,\ \underline{\underline{\frac{1}{2}}},\ \sqrt{3},\ \underline{\underline{\frac{1}{4}}},\ \sqrt{5},\ \underline{\underline{\frac{1}{6}}},\ \sqrt{7},\ \underline{\underline{\frac{1}{8}}},\ 3,\ \underline{\underline{\frac{1}{10}}},\ldots \qquad c_n = \begin{cases} \frac{1}{n}, & \text{ako je } n \text{ paran} \\ \sqrt{n}, & \text{ako je } n \text{ neparan} \end{cases}$$

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- Niz (c_n) ima samo jedno gomilište, ali ipak nije konvergentan.
- U svakoj okolini broja 0 se nalazi beskonačno mnogo članova niza (c_n) koji se nalaze na parnim pozicijama (jer je 0 gomilište).

c)

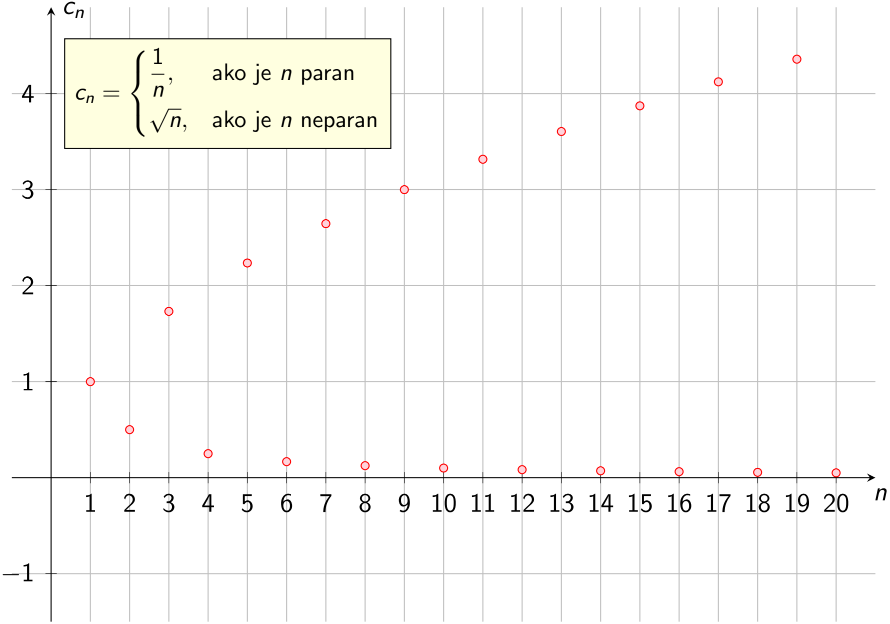
$$1,\ \frac{1}{2},\ \sqrt{3},\ \frac{1}{4},\ \sqrt{5},\ \frac{1}{6},\ \sqrt{7},\ \frac{1}{8},\ 3,\ \frac{1}{10},\ \ldots \qquad c_n = \begin{cases} \frac{1}{n}, & \text{ako je } n \text{ paran} \\ \sqrt{n}, & \text{ako je } n \text{ neparan} \end{cases}$$

- Broj 0 je gomilište niza (c_n) jer svaka okolina tog broja sadrži beskonačno mnogo članova tog niza koji se nalaze na parnim pozicijama, tj. podniz $(c_{2k})_{k\in\mathbb{N}}$ konvergira broju 0.
- Niz (c_n) ima samo jedno gomilište, ali ipak nije konvergentan.
- U svakoj okolini broja 0 se nalazi beskonačno mnogo članova niza (c_n) koji se nalaze na parnim pozicijama (jer je 0 gomilište).
- Međutim, izvan svake dovoljno male okoline broja 0 se nalazi također beskonačno mnogo članova niza (c_n) koji se nalaze na neparnim pozicijama pa 0 ne može biti limes niza (c_n).

c)

$$1,\ \frac{1}{2},\ \sqrt{3},\ \frac{1}{4},\ \sqrt{5},\ \frac{1}{6},\ \sqrt{7},\ \frac{1}{8},\ 3,\ \frac{1}{10},\dots \qquad c_n = \begin{cases} \dfrac{1}{n}, & \text{ako je } n \text{ paran} \\ \sqrt{n}, & \text{ako je } n \text{ neparan} \end{cases}$$

- Broj 0 je gomilište niza (c_n) jer svaka okolina tog broja sadrži beskonačno mnogo članova tog niza koji se nalaze na parnim pozicijama, tj. podniz $(c_{2k})_{k\in\mathbb{N}}$ konvergira broju 0.
- Niz (c_n) ima samo jedno gomilište, ali ipak nije konvergentan.
- U svakoj okolini broja 0 se nalazi beskonačno mnogo članova niza (c_n) koji se nalaze na parnim pozicijama (jer je 0 gomilište).
- Međutim, izvan svake dovoljno male okoline broja 0 se nalazi također beskonačno mnogo članova niza (c_n) koji se nalaze na neparnim pozicijama pa 0 ne može biti limes niza (c_n).
- Naime, podniz $(c_{2k-1})_{k\in\mathbb{N}}$ divergira u $+\infty$.



c_n
$c_n = \begin{cases} \frac{1}{n}, & \text{ako je } n \text{ paran} \\ \sqrt{n}, & \text{ako je } n \text{ neparan} \end{cases}$
4
3
2
1
−1
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
n

d)
$$d_n = \begin{cases} p + \dfrac{1}{p^k}, & \text{ako je } n = p^k \text{ za neki prosti broj } p \text{ i neki } k \in \mathbb{N} \\ n, & \text{inače} \end{cases}$$

d) $$d_n = \begin{cases} p + \dfrac{1}{p^k}, & \text{ako je } n = p^k \text{ za neki prosti broj } p \text{ i neki } k \in \mathbb{N} \\ n, & \text{inače} \end{cases}$$

- Za svaki prosti broj p, podniz $(d_{p^k})_{k\in\mathbb{N}}$ je oblika

$$p + \frac{1}{p},\ p + \frac{1}{p^2},\ p + \frac{1}{p^3},\ p + \frac{1}{p^4}, \dots$$

i konvergira broju p.

d) $$d_n = \begin{cases} p + \dfrac{1}{p^k}, & \text{ako je } n = p^k \text{ za neki prosti broj } p \text{ i neki } k \in \mathbb{N} \\ n, & \text{inače} \end{cases}$$

- Za svaki prosti broj p, podniz $(d_{p^k})_{k\in\mathbb{N}}$ je oblika

$$p + \frac{1}{p},\ p + \frac{1}{p^2},\ p + \frac{1}{p^3},\ p + \frac{1}{p^4}, \ldots$$

  i konvergira broju p.

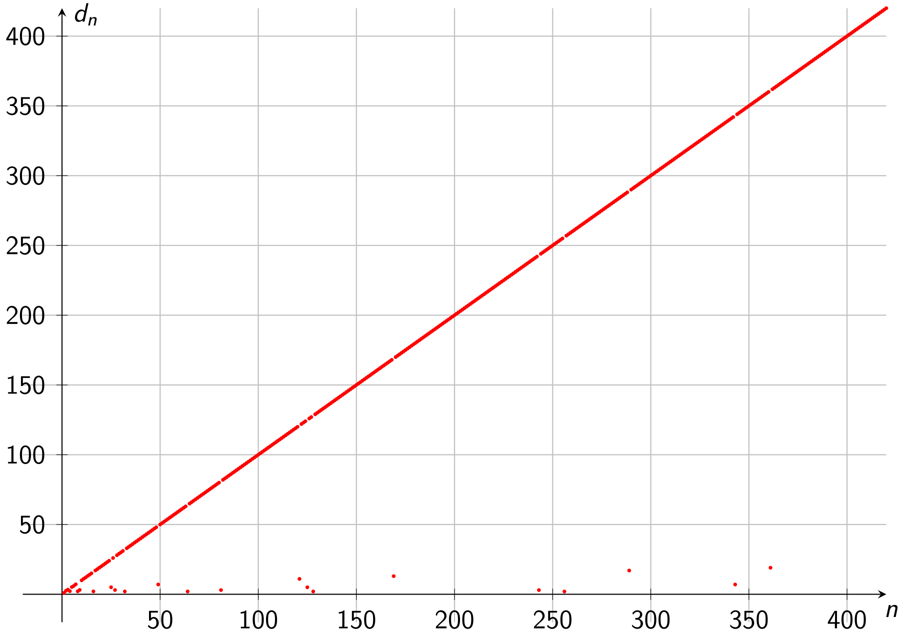
- Dakle, svaki prosti broj p je gomilište niza (d_n). Stoga niz (d_n) ima prebrojivo beskonačno mnogo gomilišta.

d) $$d_n = \begin{cases} p + \dfrac{1}{p^k}, & \text{ako je } n = p^k \text{ za neki prosti broj } p \text{ i neki } k \in \mathbb{N} \\ n, & \text{inače} \end{cases}$$

- Za svaki prosti broj p, podniz $(d_{p^k})_{k\in\mathbb{N}}$ je oblika
$$p + \frac{1}{p},\ p + \frac{1}{p^2},\ p + \frac{1}{p^3},\ p + \frac{1}{p^4}, \ldots$$
i konvergira broju p.
- Dakle, svaki prosti broj p je gomilište niza (d_n). Stoga niz (d_n) ima prebrojivo beskonačno mnogo gomilišta.
- Također, podniz niza (d_n) čiji članovi se nalaze na pozicijama koje nisu potencije prostog broja divergira u $+\infty$.

d) $$d_n = \begin{cases} p + \dfrac{1}{p^k}, & \text{ako je } n = p^k \text{ za neki prosti broj } p \text{ i neki } k \in \mathbb{N} \\ n, & \text{inače} \end{cases}$$

- Za svaki prosti broj p, podniz $(d_{p^k})_{k\in\mathbb{N}}$ je oblika
$$p + \frac{1}{p},\ p + \frac{1}{p^2},\ p + \frac{1}{p^3},\ p + \frac{1}{p^4}, \dots$$
i konvergira broju p.
- Dakle, svaki prosti broj p je gomilište niza (d_n). Stoga niz (d_n) ima prebrojivo beskonačno mnogo gomilišta.
- Također, podniz niza (d_n) čiji članovi se nalaze na pozicijama koje nisu potencije prostog broja divergira u $+\infty$.
- Niz (d_n) nije konvergentan jer ima više od jednog gomilišta i još k tome sadrži podniz koji divergira u $+\infty$.



d_n
400
350
300
250
200
150
100
50
50
100
150
200
250
300
350
400
n

Napomena

- Niz $a_n = \sin n$ ima neprebrojivo beskonačno mnogo gomilišta i skup svih njegovih gomilišta jednak je segmentu $[-1, 1]$.

Napomena

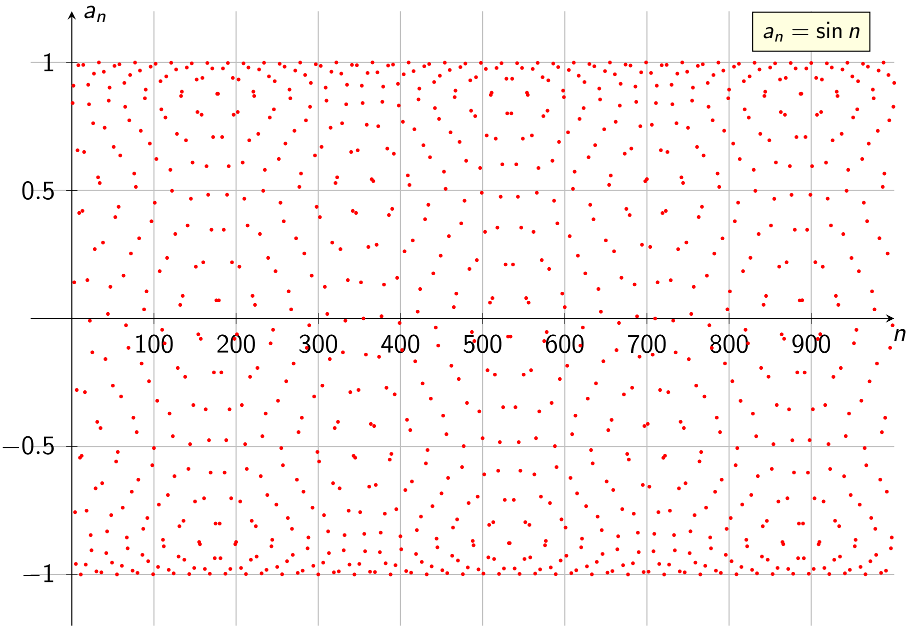
- Niz $a_n = \sin n$ ima neprebrojivo beskonačno mnogo gomilišta i skup svih njegovih gomilišta jednak je segmentu $[-1, 1]$.
- Članovi niza (a_n) su gusto raspoređeni unutar segmenta $[-1, 1]$, tj. u svakoj okolini bilo kojeg broja iz segmenta $[-1, 1]$ se nalazi beskonačno mnogo članova niza (a_n).

Napomena

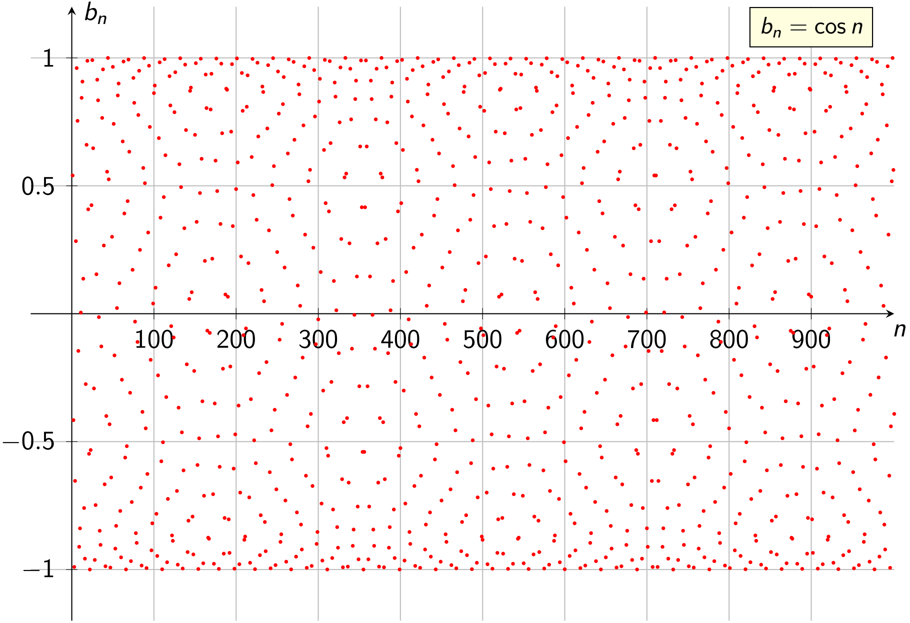
- Niz $a_n = \sin n$ ima neprebrojivo beskonačno mnogo gomilišta i skup svih njegovih gomilišta jednak je segmentu $[-1, 1]$.
- Članovi niza (a_n) su gusto raspoređeni unutar segmenta $[-1, 1]$, tj. u svakoj okolini bilo kojeg broja iz segmenta $[-1, 1]$ se nalazi beskonačno mnogo članova niza (a_n).
- Niz $b_n = \cos n$ ima neprebrojivo beskonačno mnogo gomilišta i skup svih njegovih gomilišta jednak je segmentu $[-1, 1]$.

Napomena

- Niz $a_n = \sin n$ ima neprebrojivo beskonačno mnogo gomilišta i skup svih njegovih gomilišta jednak je segmentu $[-1, 1]$.
- Članovi niza (a_n) su gusto raspoređeni unutar segmenta $[-1, 1]$, tj. u svakoj okolini bilo kojeg broja iz segmenta $[-1, 1]$ se nalazi beskonačno mnogo članova niza (a_n).
- Niz $b_n = \cos n$ ima neprebrojivo beskonačno mnogo gomilišta i skup svih njegovih gomilišta jednak je segmentu $[-1, 1]$.
- Članovi niza (b_n) su gusto raspoređeni unutar segmenta $[-1, 1]$, tj. u svakoj okolini bilo kojeg broja iz segmenta $[-1, 1]$ se nalazi beskonačno mnogo članova niza (b_n).



a_n
$a_n = \sin n$
1
0.5
−0.5
−1
100
200
300
400
500
600
700
800
900
n


b_n
$b_n = \cos n$
1
0.5
−0.5
−1
100
200
300
400
500
600
700
800
900
n

Napomena

- Ako je $\omega \in \mathbb{R}$ takav da je $\frac{\omega}{\pi} \in \mathbb{R} \setminus \mathbb{Q}$, tada su članovi nizova

$$c_n = \sin(\omega n) \quad \text{i} \quad d_n = \cos(\omega n)$$

  gusto raspoređeni unutar segmenta $[-1, 1]$, tj. skup njihovih gomilišta jednak je segmentu $[-1, 1]$.

- Članovi nizova

$$u_n = \operatorname{tg} n \quad \text{i} \quad v_n = \operatorname{ctg} n$$

  gusto su raspoređeni na skupu $\mathbb{R}$, tj. svaki realni broj je gomilište tih nizova.

drugi zadatak

Zadatak 2

Izračunajte sljedeće limese:

a) $\lim\limits_{n\to+\infty} \dfrac{5n^2 - n - 7}{6n^3 - 5n^2 + 1}$

b) $\lim\limits_{n\to+\infty} \dfrac{5n^3 + 2n + 9}{6n^2 - 5n + 8}$

c) $\lim\limits_{n\to+\infty} \dfrac{(n-1)^8}{3n^3(5+n)^5}$

Rješenje

a)

$$\lim_{n\to+\infty} \frac{5n^2 - n - 7}{6n^3 - 5n^2 + 1} =$$

Rješenje

a)

$$\boxed{\frac{\infty}{\infty}} \rightsquigarrow \lim_{n\to+\infty} \frac{5n^2 - n - 7}{6n^3 - 5n^2 + 1} =$$

- Najveća potencija u brojniku je n^2.

Rješenje

a)

$\dfrac{\infty}{\infty}$

$$\lim_{n\to+\infty} \frac{5n^2 - n - 7}{6n^3 - 5n^2 + 1} =$$

- Najveća potencija u brojniku je n^2.
- Najveća potencija u nazivniku je n^3.

Rješenje

a)

$\frac{\infty}{\infty}$ ⟿

$$\lim_{n\to+\infty} \frac{5n^2 - n - 7}{6n^3 - 5n^2 + 1} =$$

- Najveća potencija u brojniku je n^2.
- Najveća potencija u nazivniku je n^3.
- Dijelimo brojnik i nazivnik s n^3.

Rješenje

a)

$\frac{\infty}{\infty}$ ⇝

$$\lim_{n\to+\infty} \frac{5n^2 - n - 7}{6n^3 - 5n^2 + 1} =$$

- Najveća potencija u brojniku je n^2.
- Najveća potencija u nazivniku je n^3.
- Dijelimo brojnik i nazivnik s n^3.

Rješenje

a)

$$\boxed{\frac{\infty}{\infty}} \rightsquigarrow \lim_{n\to+\infty} \frac{5n^2 - n - 7}{6n^3 - 5n^2 + 1} = \lim_{n\to+\infty} \frac{\qquad}{\qquad}$$

- Najveća potencija u brojniku je n^2.
- Najveća potencija u nazivniku je n^3.
- Dijelimo brojnik i nazivnik s n^3.

Rješenje

a)

$\frac{\infty}{\infty}$

$$\lim_{n\to+\infty} \frac{5n^2 - n - 7}{6n^3 - 5n^2 + 1} = \lim_{n\to+\infty} \frac{\frac{5n^2 - n - 7}{n^3}}{}$$

- Najveća potencija u brojniku je n^2.
- Najveća potencija u nazivniku je n^3.
- Dijelimo brojnik i nazivnik s n^3.

Rješenje

a)

$$\frac{\infty}{\infty} \rightsquigarrow \lim_{n\to+\infty} \frac{5n^2 - n - 7}{6n^3 - 5n^2 + 1} = \lim_{n\to+\infty} \frac{\frac{5n^2 - n - 7}{n^3}}{\frac{6n^3 - 5n^2 + 1}{n^3}}$$

- Najveća potencija u brojniku je n^2.
- Najveća potencija u nazivniku je n^3.
- Dijelimo brojnik i nazivnik s n^3.

Rješenje

a)

$\frac{\infty}{\infty}$

$$\lim_{n\to+\infty} \frac{5n^2 - n - 7}{6n^3 - 5n^2 + 1} = \lim_{n\to+\infty} \frac{\frac{5n^2 - n - 7}{n^3}}{\frac{6n^3 - 5n^2 + 1}{n^3}} =$$

$$= \lim_{n\to+\infty} \frac{\quad}{\quad}$$

- Najveća potencija u brojniku je n^2.
- Najveća potencija u nazivniku je n^3.
- Dijelimo brojnik i nazivnik s n^3.

Rješenje

a)

$\frac{\infty}{\infty}$

$$\lim_{n\to+\infty} \frac{5n^2 - n - 7}{6n^3 - 5n^2 + 1} = \lim_{n\to+\infty} \frac{\frac{5n^2 - n - 7}{n^3}}{\frac{6n^3 - 5n^2 + 1}{n^3}} =$$

$$= \lim_{n\to+\infty} \frac{\frac{5}{n} - \frac{1}{n^2} - \frac{7}{n^3}}{}$$

- Najveća potencija u brojniku je n^2.
- Najveća potencija u nazivniku je n^3.
- Dijelimo brojnik i nazivnik s n^3.

Rješenje

a)

$\frac{\infty}{\infty}$

$$\lim_{n\to+\infty} \frac{5n^2 - n - 7}{6n^3 - 5n^2 + 1} = \lim_{n\to+\infty} \frac{\frac{5n^2 - n - 7}{n^3}}{\frac{6n^3 - 5n^2 + 1}{n^3}} =$$

$$= \lim_{n\to+\infty} \frac{\frac{5}{n} - \frac{1}{n^2} - \frac{7}{n^3}}{6 - \frac{5}{n} + \frac{1}{n^3}}$$

- Najveća potencija u brojniku je n^2.
- Najveća potencija u nazivniku je n^3.
- Dijelimo brojnik i nazivnik s n^3.

Rješenje

a)

$\frac{\infty}{\infty}$

$$\lim_{n\to+\infty} \frac{5n^2 - n - 7}{6n^3 - 5n^2 + 1} = \lim_{n\to+\infty} \frac{\frac{5n^2 - n - 7}{n^3}}{\frac{6n^3 - 5n^2 + 1}{n^3}} =$$

$$= \lim_{n\to+\infty} \frac{\frac{5}{n} - \frac{1}{n^2} - \frac{7}{n^3}}{6 - \frac{5}{n} + \frac{1}{n^3}} = \underline{\qquad\qquad}$$

- Najveća potencija u brojniku je n^2.
- Najveća potencija u nazivniku je n^3.
- Dijelimo brojnik i nazivnik s n^3.

Rješenje

a)

$\dfrac{\infty}{\infty}$

$$\lim_{n\to+\infty} \frac{5n^2 - n - 7}{6n^3 - 5n^2 + 1} = \lim_{n\to+\infty} \frac{\dfrac{5n^2 - n - 7}{n^3}}{\dfrac{6n^3 - 5n^2 + 1}{n^3}} =$$

$$= \lim_{n\to+\infty} \frac{\dfrac{5}{n} - \dfrac{1}{n^2} - \dfrac{7}{n^3}}{6 - \dfrac{5}{n} + \dfrac{1}{n^3}} = \underline{\qquad\qquad}$$

$$\lim_{n\to+\infty} \frac{c}{n^p} = 0, \quad c, p \in \mathbb{R},\ p > 0$$

- Najveća potencija u brojniku je n^2.
- Najveća potencija u nazivniku je n^3.
- Dijelimo brojnik i nazivnik s n^3.

Rješenje

a)

$\frac{\infty}{\infty}$

$$\lim_{n\to+\infty} \frac{5n^2 - n - 7}{6n^3 - 5n^2 + 1} = \lim_{n\to+\infty} \frac{\frac{5n^2 - n - 7}{n^3}}{\frac{6n^3 - 5n^2 + 1}{n^3}} =$$

$$= \lim_{n\to+\infty} \frac{\frac{5}{n} - \frac{1}{n^2} - \frac{7}{n^3}}{6 - \frac{5}{n} + \frac{1}{n^3}} = \frac{0 - 0 - 0}{}$$

$$\lim_{n\to+\infty} \frac{c}{n^p} = 0, \quad c, p \in \mathbb{R},\ p > 0$$

- Najveća potencija u brojniku je n^2.
- Najveća potencija u nazivniku je n^3.
- Dijelimo brojnik i nazivnik s n^3.

Rješenje

a)

$\frac{\infty}{\infty}$

$$\lim_{n\to+\infty}\frac{5n^2-n-7}{6n^3-5n^2+1}=\lim_{n\to+\infty}\frac{\frac{5n^2-n-7}{n^3}}{\frac{6n^3-5n^2+1}{n^3}}=$$

$$=\lim_{n\to+\infty}\frac{\frac{5}{n}-\frac{1}{n^2}-\frac{7}{n^3}}{6-\frac{5}{n}+\frac{1}{n^3}}=\frac{0-0-0}{6-0+0}$$

$$\lim_{n\to+\infty}\frac{c}{n^p}=0,\quad c,p\in\mathbb{R},\ p>0$$

- Najveća potencija u brojniku je n^2.
- Najveća potencija u nazivniku je n^3.
- Dijelimo brojnik i nazivnik s n^3.

Rješenje

a)

$\frac{\infty}{\infty}$

$$\lim_{n\to+\infty} \frac{5n^2 - n - 7}{6n^3 - 5n^2 + 1} = \lim_{n\to+\infty} \frac{\frac{5n^2 - n - 7}{n^3}}{\frac{6n^3 - 5n^2 + 1}{n^3}} =$$

$$= \lim_{n\to+\infty} \frac{\frac{5}{n} - \frac{1}{n^2} - \frac{7}{n^3}}{6 - \frac{5}{n} + \frac{1}{n^3}} = \frac{0 - 0 - 0}{6 - 0 + 0} = \frac{0}{6}$$

$$\lim_{n\to+\infty} \frac{c}{n^p} = 0, \quad c, p \in \mathbb{R},\ p > 0$$

- Najveća potencija u brojniku je n^2.
- Najveća potencija u nazivniku je n^3.
- Dijelimo brojnik i nazivnik s n^3.

Rješenje

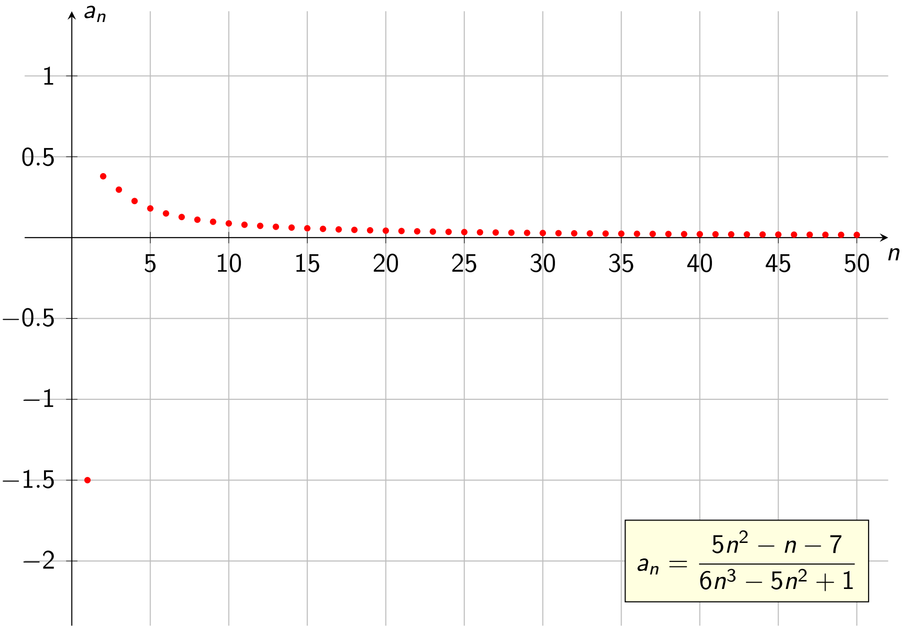
a)

$\dfrac{\infty}{\infty}$

$$\lim_{n\to+\infty} \frac{5n^2-n-7}{6n^3-5n^2+1} = \lim_{n\to+\infty} \frac{\dfrac{5n^2-n-7}{n^3}}{\dfrac{6n^3-5n^2+1}{n^3}} =$$

$$= \lim_{n\to+\infty} \frac{\dfrac{5}{n}-\dfrac{1}{n^2}-\dfrac{7}{n^3}}{6-\dfrac{5}{n}+\dfrac{1}{n^3}} = \frac{0-0-0}{6-0+0} = \frac{0}{6} = 0$$

$$\lim_{n\to+\infty} \frac{c}{n^p} = 0, \quad c, p \in \mathbb{R},\ p > 0$$



a_n
1
0.5
−0.5
−1
−1.5
−2
5
10
15
20
25
30
35
40
45
50
n
$a_n = \frac{5n^2 - n - 7}{6n^3 - 5n^2 + 1}$

b)

$$\lim_{n \to +\infty} \frac{5n^3 + 2n + 9}{6n^2 - 5n + 8} =$$

b)

$$\boxed{\frac{\infty}{\infty}} \rightsquigarrow \lim_{n\to+\infty} \frac{5n^3+2n+9}{6n^2-5n+8} =$$

b)

- Najveća potencija u brojniku je n^3.

$$\frac{\infty}{\infty} \rightsquigarrow \lim_{n\to+\infty} \frac{5n^3+2n+9}{6n^2-5n+8} =$$

b)

- Najveća potencija u brojniku je n^3.
- Najveća potencija u nazivniku je n^2.

$\frac{\infty}{\infty}$

$$\lim_{n\to+\infty} \frac{5n^3+2n+9}{6n^2-5n+8} =$$

b)

- Najveća potencija u brojniku je n^3.
- Najveća potencija u nazivniku je n^2.
- Dijelimo brojnik i nazivnik s n^3.

$$\frac{\infty}{\infty} \rightsquigarrow \lim_{n\to+\infty} \frac{5n^3+2n+9}{6n^2-5n+8} =$$

b)

- Najveća potencija u brojniku je n^3.
- Najveća potencija u nazivniku je n^2.
- Dijelimo brojnik i nazivnik s n^3.

$\frac{\infty}{\infty}$ ⟿

$$\lim_{n\to+\infty} \frac{5n^3+2n+9}{6n^2-5n+8} = \lim_{n\to+\infty} \frac{}{}$$

b)

- Najveća potencija u brojniku je n^3.
- Najveća potencija u nazivniku je n^2.
- Dijelimo brojnik i nazivnik s n^3.

$\frac{\infty}{\infty}$ ⟶

$$\lim_{n\to+\infty} \frac{5n^3+2n+9}{6n^2-5n+8} = \lim_{n\to+\infty} \frac{\frac{5n^3+2n+9}{n^3}}{}$$

b)

- Najveća potencija u brojniku je n^3.
- Najveća potencija u nazivniku je n^2.
- Dijelimo brojnik i nazivnik s n^3.

$\frac{\infty}{\infty}$ ⇝

$$\lim_{n\to+\infty} \frac{5n^3+2n+9}{6n^2-5n+8} = \lim_{n\to+\infty} \frac{\frac{5n^3+2n+9}{n^3}}{\frac{6n^2-5n+8}{n^3}}$$

b)

- Najveća potencija u brojniku je n^3.
- Najveća potencija u nazivniku je n^2.
- Dijelimo brojnik i nazivnik s n^3.

$\frac{\infty}{\infty}$

$$\lim_{n\to+\infty} \frac{5n^3+2n+9}{6n^2-5n+8} = \lim_{n\to+\infty} \frac{\frac{5n^3+2n+9}{n^3}}{\frac{6n^2-5n+8}{n^3}} =$$

$$= \lim_{n\to+\infty} \frac{}{}$$

b)

- Najveća potencija u brojniku je n^3.
- Najveća potencija u nazivniku je n^2.
- Dijelimo brojnik i nazivnik s n^3.

$\frac{\infty}{\infty}$ ⇝ $$\lim_{n\to+\infty} \frac{5n^3+2n+9}{6n^2-5n+8} = \lim_{n\to+\infty} \frac{\frac{5n^3+2n+9}{n^3}}{\frac{6n^2-5n+8}{n^3}} =$$

$$= \lim_{n\to+\infty} \frac{5+\frac{2}{n^2}+\frac{9}{n^3}}{}$$

b)

- Najveća potencija u brojniku je n^3.
- Najveća potencija u nazivniku je n^2.
- Dijelimo brojnik i nazivnik s n^3.

$\frac{\infty}{\infty}$

$$\lim_{n\to+\infty} \frac{5n^3+2n+9}{6n^2-5n+8} = \lim_{n\to+\infty} \frac{\frac{5n^3+2n+9}{n^3}}{\frac{6n^2-5n+8}{n^3}} =$$

$$= \lim_{n\to+\infty} \frac{5+\frac{2}{n^2}+\frac{9}{n^3}}{\frac{6}{n}-\frac{5}{n^2}+\frac{8}{n^3}}$$

b)

- Najveća potencija u brojniku je n^3.
- Najveća potencija u nazivniku je n^2.
- Dijelimo brojnik i nazivnik s n^3.

$\frac{\infty}{\infty}$

$$\lim_{n\to+\infty} \frac{5n^3+2n+9}{6n^2-5n+8} = \lim_{n\to+\infty} \frac{\frac{5n^3+2n+9}{n^3}}{\frac{6n^2-5n+8}{n^3}} =$$

$$= \lim_{n\to+\infty} \frac{5+\frac{2}{n^2}+\frac{9}{n^3}}{\frac{6}{n}-\frac{5}{n^2}+\frac{8}{n^3}} = \underline{\qquad\qquad}$$

b)

- Najveća potencija u brojniku je n^3.
- Najveća potencija u nazivniku je n^2.
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$\frac{\infty}{\infty}$ ⇝

$$\lim_{n\to+\infty} \frac{5n^3+2n+9}{6n^2-5n+8} = \lim_{n\to+\infty} \frac{\frac{5n^3+2n+9}{n^3}}{\frac{6n^2-5n+8}{n^3}} =$$

$$= \lim_{n\to+\infty} \frac{5+\frac{2}{n^2}+\frac{9}{n^3}}{\frac{6}{n}-\frac{5}{n^2}+\frac{8}{n^3}} = \_\_\_\_\_\_\_\_$$

$$\lim_{n\to+\infty} \frac{c}{n^p} = 0, \quad c, p \in \mathbb{R},\ p > 0$$

b)

- Najveća potencija u brojniku je n^3.
- Najveća potencija u nazivniku je n^2.
- Dijelimo brojnik i nazivnik s n^3.

$\frac{\infty}{\infty}$ ⇝

$$\lim_{n\to+\infty} \frac{5n^3+2n+9}{6n^2-5n+8} = \lim_{n\to+\infty} \frac{\frac{5n^3+2n+9}{n^3}}{\frac{6n^2-5n+8}{n^3}} =$$

$$= \lim_{n\to+\infty} \frac{5+\frac{2}{n^2}+\frac{9}{n^3}}{\frac{6}{n}-\frac{5}{n^2}+\frac{8}{n^3}} = \frac{5+0+0}{}$$

$$\lim_{n\to+\infty} \frac{c}{n^p} = 0, \quad c, p \in \mathbb{R},\ p > 0$$

b)

- Najveća potencija u brojniku je n^3.
- Najveća potencija u nazivniku je n^2.
- Dijelimo brojnik i nazivnik s n^3.

$\frac{\infty}{\infty}$

$$\lim_{n\to+\infty} \frac{5n^3+2n+9}{6n^2-5n+8} = \lim_{n\to+\infty} \frac{\frac{5n^3+2n+9}{n^3}}{\frac{6n^2-5n+8}{n^3}} =$$

$$= \lim_{n\to+\infty} \frac{5+\frac{2}{n^2}+\frac{9}{n^3}}{\frac{6}{n}-\frac{5}{n^2}+\frac{8}{n^3}} = \frac{5+0+0}{0-0+0}$$

$$\lim_{n\to+\infty} \frac{c}{n^p} = 0, \quad c, p \in \mathbb{R},\ p > 0$$

b)

- Najveća potencija u brojniku je n^3.
- Najveća potencija u nazivniku je n^2.
- Dijelimo brojnik i nazivnik s n^3.

$\frac{\infty}{\infty}$

$$\lim_{n\to+\infty} \frac{5n^3+2n+9}{6n^2-5n+8} = \lim_{n\to+\infty} \frac{\frac{5n^3+2n+9}{n^3}}{\frac{6n^2-5n+8}{n^3}} =$$

$$= \lim_{n\to+\infty} \frac{5+\frac{2}{n^2}+\frac{9}{n^3}}{\frac{6}{n}-\frac{5}{n^2}+\frac{8}{n^3}} = \frac{5+0+0}{0-0+0} = \frac{5}{0+}$$

$$\lim_{n\to+\infty} \frac{c}{n^p} = 0, \quad c, p \in \mathbb{R},\ p > 0$$

b)

- Najveća potencija u brojniku je n^3.
- Najveća potencija u nazivniku je n^2.
- Dijelimo brojnik i nazivnik s n^3.

$\frac{\infty}{\infty}$

$$\lim_{n\to+\infty}\frac{5n^3+2n+9}{6n^2-5n+8}=\lim_{n\to+\infty}\frac{\frac{5n^3+2n+9}{n^3}}{\frac{6n^2-5n+8}{n^3}}=$$

$$=\lim_{n\to+\infty}\frac{5+\frac{2}{n^2}+\frac{9}{n^3}}{\frac{6}{n}-\frac{5}{n^2}+\frac{8}{n^3}}=\frac{5+0+0}{0-0+0}=\frac{5}{0+}=+\infty$$

$$\lim_{n\to+\infty}\frac{c}{n^p}=0,\quad c,p\in\mathbb{R},\ p>0$$

b)

- Najveća potencija u brojniku je n^3.
- Najveća potencija u nazivniku je n^2.
- Dijelimo brojnik i nazivnik s n^3.

- Za jako veliki $n \in \mathbb{N}$ vrijedi $\frac{6}{n} - \frac{5}{n^2} > 0$.

$\frac{\infty}{\infty}$

$$= \lim_{n\to+\infty} \frac{5 + \frac{2}{n^2} + \frac{9}{n^3}}{\frac{6}{n} - \frac{5}{n^2} + \frac{8}{n^3}} = \frac{5+0+0}{0-0+0} = \frac{5}{0+} = +\infty$$

$$\lim_{n\to+\infty} \frac{c}{n^p} = 0, \quad c, p \in \mathbb{R},\ p > 0$$

b)

- Najveća potencija u brojniku je n^3.
- Najveća potencija u nazivniku je n^2.
- Dijelimo brojnik i nazivnik s n^3.

- Za jako veliki $n \in \mathbb{N}$ vrijedi $\frac{6}{n} - \frac{5}{n^2} > 0$.
- Dakle, za jako veliki $n \in \mathbb{N}$ je izraz $\frac{6}{n} - \frac{5}{n^2} + \frac{8}{n^3}$ jako blizu nule s desne (plus) strane.

$\frac{\infty}{\infty}$

$$= \lim_{n\to+\infty} \frac{5 + \frac{2}{n^2} + \frac{9}{n^3}}{\frac{6}{n} - \frac{5}{n^2} + \frac{8}{n^3}} = \frac{5+0+0}{0-0+0} = \frac{5}{0+} = +\infty$$

$$\lim_{n\to+\infty} \frac{c}{n^p} = 0, \quad c, p \in \mathbb{R},\ p > 0$$

b)

- Najveća potencija u brojniku je n^3.
- Najveća potencija u nazivniku je n^2.
- Dijelimo brojnik i nazivnik s n^3.

- Za jako veliki $n \in \mathbb{N}$ vrijedi $\frac{6}{n} - \frac{5}{n^2} > 0$.
- Dakle, za jako veliki $n \in \mathbb{N}$ je izraz $\frac{6}{n} - \frac{5}{n^2} + \frac{8}{n^3}$ jako blizu nule s desne (plus) strane.
- $\frac{5}{0+}$ čitamo kao *"pet kroz jako mali pozitivni broj"*.

$$\frac{\infty}{\infty}$$

$$= \lim_{n\to+\infty} \frac{5 + \frac{2}{n^2} + \frac{9}{n^3}}{\frac{6}{n} - \frac{5}{n^2} + \frac{8}{n^3}} = \frac{5+0+0}{0-0+0} = \frac{5}{0+} = +\infty$$

$$\lim_{n\to+\infty} \frac{c}{n^p} = 0, \quad c, p \in \mathbb{R},\ p > 0$$

b)

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- Najveća potencija u nazivniku je n^2.
- Dijelimo brojnik i nazivnik s n^3.

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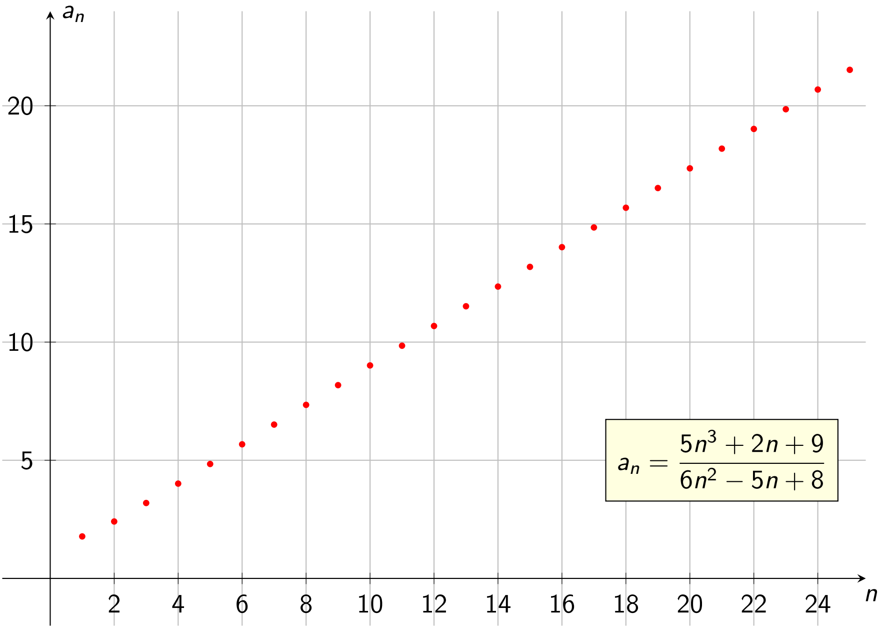
$$\lim_{n\to+\infty}\frac{5n^3+2n+9}{6n^2-5n+8}=\lim_{n\to+\infty}\frac{\frac{5n^3+2n+9}{n^3}}{\frac{6n^2-5n+8}{n^3}}=$$

$$=\lim_{n\to+\infty}\frac{5+\frac{2}{n^2}+\frac{9}{n^3}}{\frac{6}{n}-\frac{5}{n^2}+\frac{8}{n^3}}=\frac{5+0+0}{0-0+0}=\frac{5}{0+}=+\infty$$

$$\lim_{n\to+\infty}\frac{c}{n^p}=0,\quad c,p\in\mathbb{R},\ p>0$$



a_n
20
15
10
5
2
4
6
8
10
12
14
16
18
20
22
24
n
$a_n = \dfrac{5n^3 + 2n + 9}{6n^2 - 5n + 8}$

c)

$$\lim_{n\to+\infty} \frac{(n-1)^8}{3n^3(5+n)^5} =$$

c)

$$\boxed{\frac{\infty}{\infty}} \rightsquigarrow \lim_{n\to+\infty} \frac{(n-1)^8}{3n^3(5+n)^5} =$$

c)

- Najveća potencija u brojniku je n^8.

$\boxed{\dfrac{\infty}{\infty}} \rightsquigarrow \lim\limits_{n\to+\infty} \dfrac{(n-1)^8}{3n^3(5+n)^5} =$

c)

- Najveća potencija u brojniku je n^8.
- Najveća potencija u nazivniku je n^8.

$\frac{\infty}{\infty}$

$$\lim_{n\to+\infty} \frac{(n-1)^8}{3n^3(5+n)^5} =$$

c)

- Najveća potencija u brojniku je n^8.
- Najveća potencija u nazivniku je n^8.
- Dijelimo brojnik i nazivnik s n^8.

$$\frac{\infty}{\infty} \rightsquigarrow \lim_{n\to+\infty} \frac{(n-1)^8}{3n^3(5+n)^5} =$$

c)

- Najveća potencija u brojniku je n^8.
- Najveća potencija u nazivniku je n^8.
- Dijelimo brojnik i nazivnik s n^8.

$$\frac{\infty}{\infty} \rightsquigarrow \lim_{n\to+\infty} \frac{(n-1)^8}{3n^3(5+n)^5} = \lim_{n\to+\infty} \frac{}{}$$

c)

- Najveća potencija u brojniku je n^8.
- Najveća potencija u nazivniku je n^8.
- Dijelimo brojnik i nazivnik s n^8.

$$\frac{\infty}{\infty} \rightsquigarrow \lim_{n\to+\infty} \frac{(n-1)^8}{3n^3(5+n)^5} = \lim_{n\to+\infty} \frac{\frac{(n-1)^8}{n^8}}{}$$

c)

- Najveća potencija u brojniku je n^8.
- Najveća potencija u nazivniku je n^8.
- Dijelimo brojnik i nazivnik s n^8.

$\frac{\infty}{\infty}$

$$\lim_{n\to+\infty} \frac{(n-1)^8}{3n^3(5+n)^5} = \lim_{n\to+\infty} \frac{\frac{(n-1)^8}{n^8}}{\frac{3n^3(5+n)^5}{n^8}}$$

c)

- Najveća potencija u brojniku je n^8.
- Najveća potencija u nazivniku je n^8.
- Dijelimo brojnik i nazivnik s n^8.

$$\frac{\infty}{\infty} \quad \lim_{n\to+\infty} \frac{(n-1)^8}{3n^3(5+n)^5} = \lim_{n\to+\infty} \frac{\frac{(n-1)^8}{n^8}}{\frac{3n^3(5+n)^5}{n^8}} =$$

$$= \lim_{n\to+\infty} \frac{\quad}{\quad}$$

c)

- Najveća potencija u brojniku je n^8.
- Najveća potencija u nazivniku je n^8.
- Dijelimo brojnik i nazivnik s n^8.

$$\boxed{\frac{\infty}{\infty}} \rightsquigarrow \lim_{n\to+\infty} \frac{(n-1)^8}{3n^3(5+n)^5} = \lim_{n\to+\infty} \frac{\frac{(n-1)^8}{n^8}}{\frac{3n^3(5+n)^5}{n^8}} =$$

$$= \lim_{n\to+\infty} \frac{\left(\frac{n-1}{n}\right)^8}{}$$

c)

- Najveća potencija u brojniku je n^8.
- Najveća potencija u nazivniku je n^8.
- Dijelimo brojnik i nazivnik s n^8.

$$\frac{\infty}{\infty} \rightsquigarrow \lim_{n\to+\infty} \frac{(n-1)^8}{3n^3(5+n)^5} = \lim_{n\to+\infty} \frac{\frac{(n-1)^8}{n^8}}{\frac{3n^3(5+n)^5}{n^8}} =$$

$$= \lim_{n\to+\infty} \frac{\left(\frac{n-1}{n}\right)^8}{\frac{3n^3}{n^3}\cdot\left(\frac{5+n}{n}\right)^5}$$

c)

- Najveća potencija u brojniku je n^8.
- Najveća potencija u nazivniku je n^8.
- Dijelimo brojnik i nazivnik s n^8.

$$\frac{\infty}{\infty} \rightsquigarrow \lim_{n\to+\infty} \frac{(n-1)^8}{3n^3(5+n)^5} = \lim_{n\to+\infty} \frac{\dfrac{(n-1)^8}{n^8}}{\dfrac{3n^3(5+n)^5}{n^8}} =$$

$$= \lim_{n\to+\infty} \frac{\left(\dfrac{n-1}{n}\right)^8}{\dfrac{3n^3}{n^3}\cdot\left(\dfrac{5+n}{n}\right)^5} = \lim_{n\to+\infty} \frac{}{}$$

c)

- Najveća potencija u brojniku je n^8.
- Najveća potencija u nazivniku je n^8.
- Dijelimo brojnik i nazivnik s n^8.

$\frac{\infty}{\infty}$

$$\lim_{n\to+\infty} \frac{(n-1)^8}{3n^3(5+n)^5} = \lim_{n\to+\infty} \frac{\frac{(n-1)^8}{n^8}}{\frac{3n^3(5+n)^5}{n^8}} =$$

$$= \lim_{n\to+\infty} \frac{\left(\frac{n-1}{n}\right)^8}{\frac{3n^3}{n^3}\cdot\left(\frac{5+n}{n}\right)^5} = \lim_{n\to+\infty} \frac{\left(1-\frac{1}{n}\right)^8}{}$$

c)

- Najveća potencija u brojniku je n^8.
- Najveća potencija u nazivniku je n^8.
- Dijelimo brojnik i nazivnik s n^8.

$\frac{\infty}{\infty}$

$$\lim_{n\to+\infty} \frac{(n-1)^8}{3n^3(5+n)^5} = \lim_{n\to+\infty} \frac{\frac{(n-1)^8}{n^8}}{\frac{3n^3(5+n)^5}{n^8}} =$$

$$= \lim_{n\to+\infty} \frac{\left(\frac{n-1}{n}\right)^8}{\frac{3n^3}{n^3}\cdot\left(\frac{5+n}{n}\right)^5} = \lim_{n\to+\infty} \frac{\left(1-\frac{1}{n}\right)^8}{3\cdot\left(\frac{5}{n}+1\right)^5}$$

c)

- Najveća potencija u brojniku je n^8.
- Najveća potencija u nazivniku je n^8.
- Dijelimo brojnik i nazivnik s n^8.

$\frac{\infty}{\infty}$

$$\lim_{n\to+\infty} \frac{(n-1)^8}{3n^3(5+n)^5} = \lim_{n\to+\infty} \frac{\frac{(n-1)^8}{n^8}}{\frac{3n^3(5+n)^5}{n^8}} =$$

$$= \lim_{n\to+\infty} \frac{\left(\frac{n-1}{n}\right)^8}{\frac{3n^3}{n^3}\cdot\left(\frac{5+n}{n}\right)^5} = \lim_{n\to+\infty} \frac{\left(1-\frac{1}{n}\right)^8}{3\cdot\left(\frac{5}{n}+1\right)^5} = \rule{3cm}{0.4pt}$$

c)

- Najveća potencija u brojniku je n^8.
- Najveća potencija u nazivniku je n^8.
- Dijelimo brojnik i nazivnik s n^8.

$\frac{\infty}{\infty}$

$$\lim_{n\to+\infty} \frac{(n-1)^8}{3n^3(5+n)^5} = \lim_{n\to+\infty} \frac{\frac{(n-1)^8}{n^8}}{\frac{3n^3(5+n)^5}{n^8}} =$$

$$= \lim_{n\to+\infty} \frac{\left(\frac{n-1}{n}\right)^8}{\frac{3n^3}{n^3}\cdot\left(\frac{5+n}{n}\right)^5} = \lim_{n\to+\infty} \frac{\left(1-\frac{1}{n}\right)^8}{3\cdot\left(\frac{5}{n}+1\right)^5} = \_\_\_\_\_\_$$

$$\lim_{n\to+\infty} \frac{c}{n^p} = 0, \quad c, p \in \mathbb{R},\ p > 0$$

c)

- Najveća potencija u brojniku je n^8.
- Najveća potencija u nazivniku je n^8.
- Dijelimo brojnik i nazivnik s n^8.

$\frac{\infty}{\infty}$

$$\lim_{n\to+\infty} \frac{(n-1)^8}{3n^3(5+n)^5} = \lim_{n\to+\infty} \frac{\frac{(n-1)^8}{n^8}}{\frac{3n^3(5+n)^5}{n^8}} =$$

$$= \lim_{n\to+\infty} \frac{\left(\frac{n-1}{n}\right)^8}{\frac{3n^3}{n^3}\cdot\left(\frac{5+n}{n}\right)^5} = \lim_{n\to+\infty} \frac{\left(1-\frac{1}{n}\right)^8}{3\cdot\left(\frac{5}{n}+1\right)^5} = \frac{(1-0)^8}{}$$

$$\lim_{n\to+\infty} \frac{c}{n^p} = 0, \quad c, p \in \mathbb{R},\ p > 0$$

c)

- Najveća potencija u brojniku je n^8.
- Najveća potencija u nazivniku je n^8.
- Dijelimo brojnik i nazivnik s n^8.

$\frac{\infty}{\infty}$

$$\lim_{n\to+\infty} \frac{(n-1)^8}{3n^3(5+n)^5} = \lim_{n\to+\infty} \frac{\frac{(n-1)^8}{n^8}}{\frac{3n^3(5+n)^5}{n^8}} =$$

$$= \lim_{n\to+\infty} \frac{\left(\frac{n-1}{n}\right)^8}{\frac{3n^3}{n^3}\cdot\left(\frac{5+n}{n}\right)^5} = \lim_{n\to+\infty} \frac{\left(1-\frac{1}{n}\right)^8}{3\cdot\left(\frac{5}{n}+1\right)^5} = \frac{(1-0)^8}{3\cdot(0+1)^5}$$

$$\lim_{n\to+\infty} \frac{c}{n^p} = 0, \quad c, p \in \mathbb{R},\ p > 0$$

c)

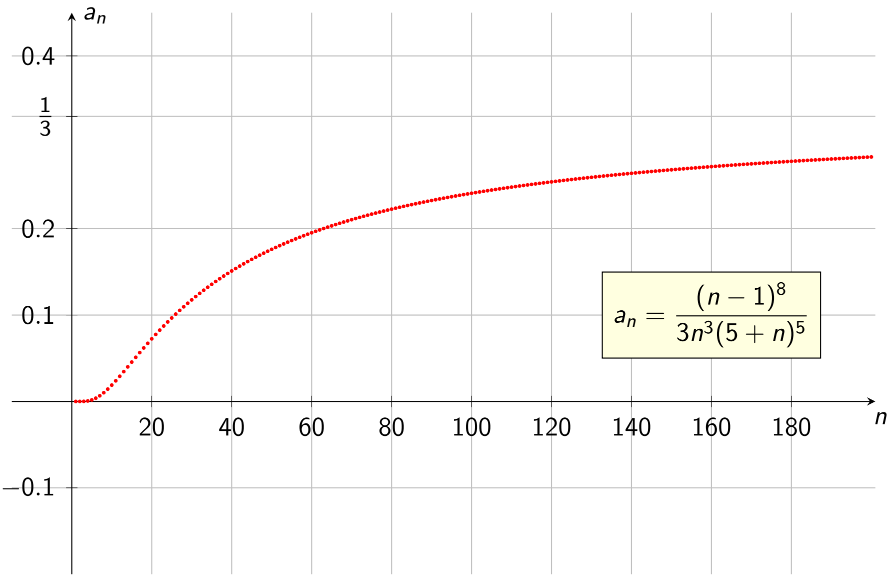
- Najveća potencija u brojniku je n^8.
- Najveća potencija u nazivniku je n^8.
- Dijelimo brojnik i nazivnik s n^8.

$\frac{\infty}{\infty}$

$$\lim_{n\to+\infty} \frac{(n-1)^8}{3n^3(5+n)^5} = \lim_{n\to+\infty} \frac{\frac{(n-1)^8}{n^8}}{\frac{3n^3(5+n)^5}{n^8}} =$$

$$= \lim_{n\to+\infty} \frac{\left(\frac{n-1}{n}\right)^8}{\frac{3n^3}{n^3}\cdot\left(\frac{5+n}{n}\right)^5} = \lim_{n\to+\infty} \frac{\left(1-\frac{1}{n}\right)^8}{3\cdot\left(\frac{5}{n}+1\right)^5} = \frac{(1-0)^8}{3\cdot(0+1)^5} = \frac{1}{3}$$

$$\lim_{n\to+\infty} \frac{c}{n^p} = 0, \quad c, p \in \mathbb{R},\ p > 0$$


a_n
0.4
$\frac{1}{3}$
0.2
0.1
−0.1
20
40
60
80
100
120
140
160
180
n
$a_n = \frac{(n-1)^8}{3n^3(5+n)^5}$

treći zadatak

Zadatak 3

Izračunajte sljedeće limese:

a) $\lim\limits_{n\to+\infty} \dfrac{\sqrt[3]{2n^3+1}}{\sqrt{2n^2-1}}$

b) $\lim\limits_{n\to+\infty} \dfrac{\sqrt{n+2}}{\sqrt{n+1}+\sqrt{n+2}}$

c) $\lim\limits_{n\to+\infty} \dfrac{\sqrt{3n^3-2n}+n}{n^2+n}$

Rješenje

a)

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

Rješenje

a)

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

$$\boxed{\frac{\infty}{\infty}}$$

Rješenje

- Najveća potencija u brojniku je $\sqrt[3]{n^3} = n$.

a)

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

$\frac{\infty}{\infty}$

Rješenje

- Najveća potencija u brojniku je $\sqrt[3]{n^3} = n$.
- Najveća potencija u nazivniku je $\sqrt{n^2} = n$.

a)

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

$\frac{\infty}{\infty}$

Rješenje

- Najveća potencija u brojniku je $\sqrt[3]{n^3} = n$.
- Najveća potencija u nazivniku je $\sqrt{n^2} = n$.
- Dijelimo brojnik i nazivnik s n.

a)

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

$$\frac{\infty}{\infty}$$

Rješenje

a)

- Najveća potencija u brojniku je $\sqrt[3]{n^3} = n$.
- Najveća potencija u nazivniku je $\sqrt{n^2} = n$.
- Dijelimo brojnik i nazivnik s n.

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

$\frac{\infty}{\infty}$

Rješenje

- Najveća potencija u brojniku je $\sqrt[3]{n^3} = n$.
- Najveća potencija u nazivniku je $\sqrt{n^2} = n$.
- Dijelimo brojnik i nazivnik s n.

a)

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

$\frac{\infty}{\infty}$

Rješenje

- Najveća potencijа u brojniku je $\sqrt[3]{n^3} = n$.
- Najveća potencija u nazivniku je $\sqrt{n^2} = n$.
- Dijelimo brojnik i nazivnik s n.

a)

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

$$\frac{\infty}{\infty}$$

Rješenje

a)

- Najveća potencija u brojniku je $\sqrt[3]{n^3} = n$.
- Najveća potencija u nazivniku je $\sqrt{n^2} = n$.
- Dijelimo brojnik i nazivnik s n.

$$\lim_{n\to+\infty} \frac{\sqrt[3]{2n^3+1}}{\sqrt{2n^2-1}} = \lim_{n\to+\infty} \frac{\frac{\sqrt[3]{2n^3+1}}{n}}{\frac{\sqrt{2n^2-1}}{n}} = \lim_{n\to+\infty} \underline{\qquad\qquad}$$

$\frac{\infty}{\infty}$

Rješenje

- Najveća potencija u brojniku je $\sqrt[3]{n^3} = n$.
- Najveća potencija u nazivniku je $\sqrt{n^2} = n$.
- Dijelimo brojnik i nazivnik s n.

a)

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

$$\frac{\infty}{\infty}$$

Rješenje

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- Najveća potencija u brojniku je $\sqrt[3]{n^3} = n$.
- Najveća potencija u nazivniku je $\sqrt{n^2} = n$.
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$$\frac{\infty}{\infty}$$

Rješenje

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$\frac{\infty}{\infty}$

$$= \lim_{n\to+\infty} \frac{\quad}{\quad}$$

Rješenje

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$$\frac{\infty}{\infty}$$

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

Rješenje

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$\frac{\infty}{\infty}$

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

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

Rješenje

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a)

$$\frac{\infty}{\infty}$$

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

Rješenje

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- Najveća potencija u brojniku je $\sqrt[3]{n^3} = n$.
- Najveća potencija u nazivniku je $\sqrt{n^2} = n$.
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$\frac{\infty}{\infty}$

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

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

Rješenje

- Najveća potencija u brojniku je $\sqrt[3]{n^3} = n$.
- Najveća potencija u nazivniku je $\sqrt{n^2} = n$.
- Dijelimo brojnik i nazivnik s n.

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$$\frac{\infty}{\infty}$$

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$$\frac{\infty}{\infty}$$

$$= \lim_{n\to+\infty} \frac{\sqrt[3]{\frac{2n^3+1}{n^3}}}{\sqrt{\frac{2n^2-1}{n^2}}} = \lim_{n\to+\infty} \frac{\sqrt[3]{2+\frac{1}{n^3}}}{\sqrt{2-\frac{1}{n^2}}} = \underline{\qquad\qquad}$$

$$\lim_{n\to+\infty} \frac{c}{n^p} = 0, \quad c, p \in \mathbb{R},\ p > 0$$

Rješenje

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- Najveća potencija u brojniku je $\sqrt[3]{n^3} = n$.
- Najveća potencija u nazivniku je $\sqrt{n^2} = n$.
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$\frac{\infty}{\infty}$

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- Najveća potencija u nazivniku je $\sqrt{n^2} = n$.
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$$\frac{\infty}{\infty}$$

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Rješenje

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- Najveća potencija u nazivniku je $\sqrt{n^2} = n$.
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$$= \text{——}$$

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$$= \frac{\sqrt[3]{2}}{}$$

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Rješenje

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$$\frac{\infty}{\infty}$$

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$$= \frac{\sqrt[3]{2}}{\sqrt{2}}$$

$$\lim_{n\to+\infty} \frac{c}{n^p} = 0, \quad c, p \in \mathbb{R},\ p > 0$$

Rješenje

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$$\sqrt[n\cdot k]{a^{m\cdot k}} = \sqrt[n]{a^m}$$

a)

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$$\frac{\infty}{\infty}$$

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$$= \frac{\sqrt[3]{2}}{\sqrt{2}} = \text{———}$$

$$\lim_{n\to+\infty} \frac{c}{n^p} = 0, \quad c, p \in \mathbb{R},\ p > 0$$

Rješenje

$$\sqrt[n\cdot k]{a^{m\cdot k}} = \sqrt[n]{a^m}$$

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$$= \frac{\sqrt[3]{2}}{\sqrt{2}} = \frac{\sqrt[6]{2^2}}{}$$

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Rješenje

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$$= \frac{\sqrt[3]{2}}{\sqrt{2}} = \frac{\sqrt[6]{2^2}}{\sqrt[6]{2^3}}$$

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$$\frac{\infty}{\infty}$$

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

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Rješenje

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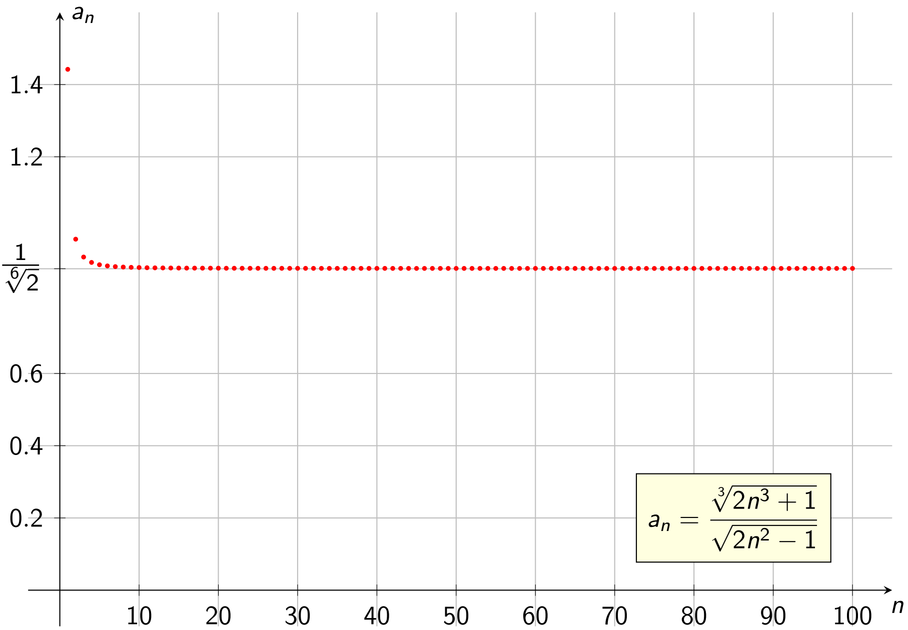
$$= \frac{\sqrt[3]{2}}{\sqrt{2}} = \frac{\sqrt[6]{2^2}}{\sqrt[6]{2^3}} = \sqrt[6]{\frac{2^2}{2^3}} = \sqrt[6]{\frac{1}{2}} = \frac{1}{\sqrt[6]{2}}$$

$$\lim_{n\to+\infty} \frac{c}{n^p} = 0, \quad c, p \in \mathbb{R},\ p > 0$$



a_n
1.4
1.2
$\frac{1}{\sqrt[6]{2}}$
0.6
0.4
0.2
10
20
30
40
50
60
70
80
90
100
n
$a_n = \frac{\sqrt[3]{2n^3+1}}{\sqrt{2n^2-1}}$

b)

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

b)

$$\boxed{\frac{\infty}{\infty}} \rightsquigarrow \lim_{n\to+\infty} \frac{\sqrt{n+2}}{\sqrt{n+1}+\sqrt{n+2}} =$$

b)

- Najveća potencija u brojniku je $\sqrt{n}$.

$$\boxed{\frac{\infty}{\infty}} \rightsquigarrow \lim_{n\to+\infty} \frac{\sqrt{n+2}}{\sqrt{n+1}+\sqrt{n+2}} =$$

b)

- Najveća potencija u brojniku je $\sqrt{n}$.
- Najveća potencija u nazivniku je $\sqrt{n}$.

$\frac{\infty}{\infty}$ $\rightsquigarrow$ $$\lim_{n\to+\infty} \frac{\sqrt{n+2}}{\sqrt{n+1}+\sqrt{n+2}} =$$

b)

- Najveća potencija u brojniku je $\sqrt{n}$.
- Najveća potencija u nazivniku je $\sqrt{n}$.
- Dijelimo brojnik i nazivnik s $\sqrt{n}$.

$\frac{\infty}{\infty}$

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

b)

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- Najveća potencija u nazivniku je $\sqrt{n}$.
- Dijelimo brojnik i nazivnik s $\sqrt{n}$.

$$\frac{\infty}{\infty} \rightsquigarrow \lim_{n\to+\infty} \frac{\sqrt{n+2}}{\sqrt{n+1}+\sqrt{n+2}} = \lim_{n\to+\infty} \frac{\qquad}{\qquad}$$

b)

- Najveća potencija u brojniku je $\sqrt{n}$.
- Najveća potencija u nazivniku je $\sqrt{n}$.
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$$\frac{\infty}{\infty} \rightsquigarrow \lim_{n\to+\infty} \frac{\sqrt{n+2}}{\sqrt{n+1}+\sqrt{n+2}} = \lim_{n\to+\infty} \frac{\frac{\sqrt{n+2}}{\sqrt{n}}}{\quad}$$

b)

- Najveća potencija u brojniku je $\sqrt{n}$.
- Najveća potencija u nazivniku je $\sqrt{n}$.
- Dijelimo brojnik i nazivnik s $\sqrt{n}$.

$\dfrac{\infty}{\infty}$

$$\lim_{n\to+\infty} \frac{\sqrt{n+2}}{\sqrt{n+1}+\sqrt{n+2}} = \lim_{n\to+\infty} \frac{\dfrac{\sqrt{n+2}}{\sqrt{n}}}{\dfrac{\sqrt{n+1}}{\sqrt{n}}+\dfrac{\sqrt{n+2}}{\sqrt{n}}}$$

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$$= \lim_{n\to+\infty} \frac{\quad}{\quad}$$

b)

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$$\frac{\infty}{\infty} \rightsquigarrow \lim_{n\to+\infty} \frac{\sqrt{n+2}}{\sqrt{n+1}+\sqrt{n+2}} = \lim_{n\to+\infty} \frac{\dfrac{\sqrt{n+2}}{\sqrt{n}}}{\dfrac{\sqrt{n+1}}{\sqrt{n}}+\dfrac{\sqrt{n+2}}{\sqrt{n}}} =$$

$$= \lim_{n\to+\infty} \frac{\sqrt{\dfrac{n+2}{n}}}{}$$

b)

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

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$$= \lim_{n\to+\infty} \frac{\sqrt{\frac{n+2}{n}}}{\sqrt{\frac{n+1}{n}}+\sqrt{\frac{n+2}{n}}} = \lim_{n\to+\infty} \frac{\quad}{\quad}$$

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

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

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

$$= \underline{\qquad\qquad\qquad}$$

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

$$=\underline{\qquad\qquad\qquad}$$

$$\lim_{n\to+\infty}\frac{c}{n^p}=0,\quad c,p\in\mathbb{R},\ p>0$$

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$$= \frac{\sqrt{1+0}}{}$$

$$\lim_{n\to+\infty} \frac{c}{n^p} = 0, \quad c, p \in \mathbb{R},\ p > 0$$

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$$=\frac{\sqrt{1+0}}{\sqrt{1+0}+\sqrt{1+0}}=\frac{\sqrt{1}}{}$$

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$$= \frac{\sqrt{1+0}}{\sqrt{1+0}+\sqrt{1+0}} = \frac{\sqrt{1}}{\sqrt{1}+\sqrt{1}}$$

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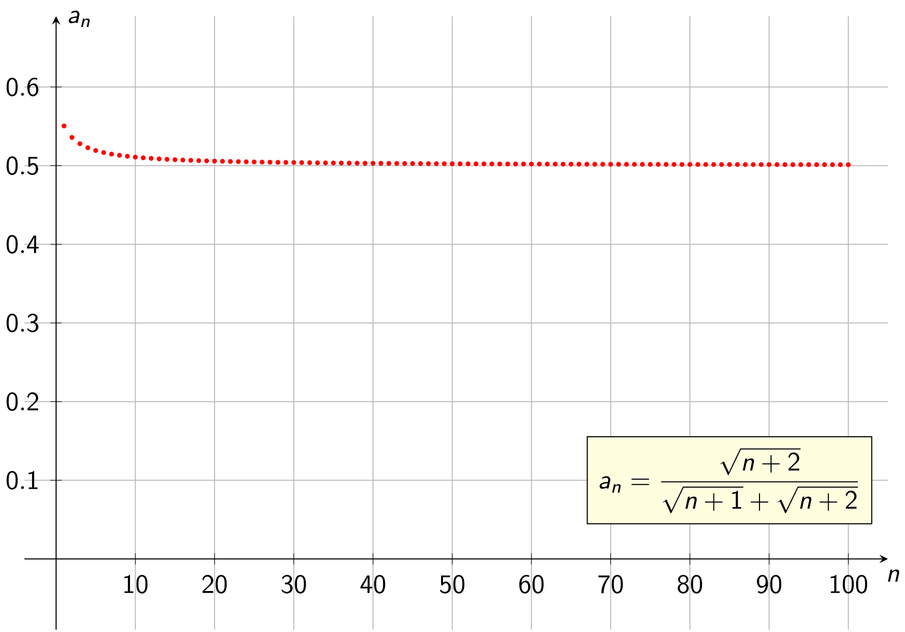
$$= \frac{\sqrt{1+0}}{\sqrt{1+0}+\sqrt{1+0}} = \frac{\sqrt{1}}{\sqrt{1}+\sqrt{1}} = \frac{1}{2}$$

$$\lim_{n\to+\infty} \frac{c}{n^p} = 0, \quad c, p \in \mathbb{R},\ p > 0$$


a_n
0.6
0.5
0.4
0.3
0.2
0.1
10
20
30
40
50
60
70
80
90
100
n
$a_n = \frac{\sqrt{n+2}}{\sqrt{n+1}+\sqrt{n+2}}$

c)

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

c)

$$\boxed{\frac{\infty}{\infty}} \rightsquigarrow \lim_{n\to+\infty} \frac{\sqrt{3n^3-2n}+n}{n^2+n} =$$

c)

- Najveća potencija u brojniku je $\sqrt{n^3} = n^{\frac{3}{2}}$.

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

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- Najveća potencija u brojniku je $\sqrt{n^3} = n^{\frac{3}{2}}$.
- Najveća potencija u nazivniku je n^2.

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$\frac{\infty}{\infty}$

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

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

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$n^2 = \sqrt{n^4}$

$$= \lim_{n\to+\infty} \frac{\sqrt{\frac{3n^3 - 2n}{n^4}} + \frac{1}{n}}{}$$

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$n^2 = \sqrt{n^4}$

$$= \lim_{n\to+\infty} \frac{\sqrt{\frac{3n^3-2n}{n^4}}+\frac{1}{n}}{1+\frac{1}{n}}$$

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$n^2 = \sqrt{n^4}$

$$= \lim_{n\to+\infty} \frac{\sqrt{\frac{3n^3-2n}{n^4}}+\frac{1}{n}}{1+\frac{1}{n}} = \lim_{n\to+\infty} \frac{\sqrt{\frac{3}{n}-\frac{2}{n^3}}+\frac{1}{n}}{}$$

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$= \underline{\qquad\qquad}$

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$$= \frac{\quad}{\quad}$$

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$$= \lim_{n\to+\infty} \frac{\sqrt{\dfrac{3n^3-2n}{n^4}}+\dfrac{1}{n}}{1+\dfrac{1}{n}} = \lim_{n\to+\infty} \frac{\sqrt{\dfrac{3}{n}-\dfrac{2}{n^3}}+\dfrac{1}{n}}{1+\dfrac{1}{n}} =$$

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$n^2 = \sqrt{n^4}$

$$= \lim_{n\to+\infty} \frac{\sqrt{\frac{3n^3-2n}{n^4}}+\frac{1}{n}}{1+\frac{1}{n}} = \lim_{n\to+\infty} \frac{\sqrt{\frac{3}{n}-\frac{2}{n^3}}+\frac{1}{n}}{1+\frac{1}{n}} =$$

$$= \frac{\sqrt{0-0}+0}{1+0} = \frac{0}{1}$$

$$\lim_{n\to+\infty} \frac{c}{n^p} = 0, \quad c, p \in \mathbb{R},\ p > 0$$

c)

- Najveća potencija u brojniku je $\sqrt{n^3} = n^{\frac{3}{2}}$.
- Najveća potencija u nazivniku je n^2.
- Dijelimo brojnik i nazivnik s n^2.

$\frac{\infty}{\infty}$

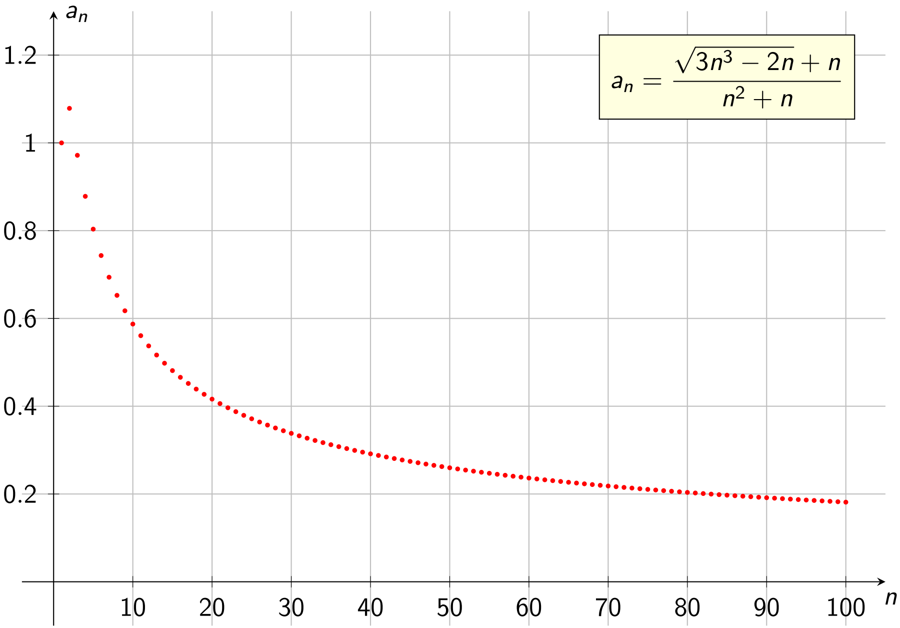
$$\lim_{n\to+\infty} \frac{\sqrt{3n^3 - 2n} + n}{n^2 + n} = \lim_{n\to+\infty} \frac{\frac{\sqrt{3n^3-2n}}{n^2} + \frac{n}{n^2}}{\frac{n^2}{n^2} + \frac{n}{n^2}} =$$

$n^2 = \sqrt{n^4}$

$$= \lim_{n\to+\infty} \frac{\sqrt{\frac{3n^3-2n}{n^4}} + \frac{1}{n}}{1 + \frac{1}{n}} = \lim_{n\to+\infty} \frac{\sqrt{\frac{3}{n} - \frac{2}{n^3}} + \frac{1}{n}}{1 + \frac{1}{n}} =$$

$$= \frac{\sqrt{0-0}+0}{1+0} = \frac{0}{1} = 0$$

$$\lim_{n\to+\infty} \frac{c}{n^p} = 0, \quad c, p \in \mathbb{R},\ p > 0$$


a_n
1.2
1
0.8
0.6
0.4
0.2
10
20
30
40
50
60
70
80
90
100
n
$a_n = \dfrac{\sqrt{3n^3 - 2n} + n}{n^2 + n}$

četvrti zadatak

Zadatak 4

Izračunajte sljedeće limese:

a) $\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)$

b) $\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)$

c) $\lim_{n\to+\infty}\frac{3-4\cdot 5^n}{5\cdot 3^{n+1}+6\cdot 5^{n-1}}$

Rješenje

a) $$\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)=$$

Rješenje

a) $$\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)=$$

$\infty-\infty$

Rješenje

a) $\lim\limits_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)=$ ← $\infty-\infty$

- n^2-n je izraz oblika $\infty-\infty$ za veliki $n\in\mathbb{N}$.

Rješenje

a) $$\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right) =$$

$\infty - \infty$

- $n^2 - n$ je izraz oblika $\infty - \infty$ za veliki $n \in \mathbb{N}$.
- Međutim, znamo da kvadratna funkcija puno brže raste od linearne funkcije.

Rješenje

a) $\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right) =$ $\infty - \infty$

- $n^2 - n$ je izraz oblika $\infty - \infty$ za veliki $n \in \mathbb{N}$.
- Međutim, znamo da kvadratna funkcija puno brže raste od linearne funkcije.
- Stoga je $\sqrt{n^2 - n}$ jako veliki broj kada je $n \in \mathbb{N}$ jako veliki broj.

Rješenje

a) $$\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)=$$

$\infty - \infty$

$a^2-b^2=(a-b)(a+b)$

Rješenje

a) $$\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)=$$

$\infty-\infty$

$$=\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)$$

$a^2-b^2=(a-b)(a+b)$

Rješenje

a)

$$\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)=$$

$\infty - \infty$

$$=\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)\cdot \underline{\qquad\qquad}$$

$a^2-b^2=(a-b)(a+b)$

Rješenje

a)
$$\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)=$$

$\infty-\infty$

$$=\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)\cdot\frac{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}{}$$

$a^2-b^2=(a-b)(a+b)$

Rješenje

a)

$$\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)=$$

$\infty - \infty$

$$=\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)\cdot\frac{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}$$

$a^2-b^2=(a-b)(a+b)$

Rješenje

a)

$$\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right) =$$

$\infty - \infty$

$$= \lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)\cdot\frac{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}} =$$

$a^2 - b^2 = (a-b)(a+b)$

$$= \lim_{n\to+\infty} \frac{\qquad}{\qquad}$$

Rješenje

a)

$$\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)=$$

$\infty - \infty$

$$=\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)\cdot\frac{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}=$$

$a^2-b^2=(a-b)(a+b)$

$$=\lim_{n\to+\infty}\frac{}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}$$

Rješenje

a)

$$\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)=$$

$\infty-\infty$

$$=\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)\cdot\frac{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}=$$

$a^2-b^2=(a-b)(a+b)$

$$=\lim_{n\to+\infty}\frac{(n^2+5n+1)}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}$$

Rješenje

a)

$$\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right) =$$

$\infty - \infty$

$$= \lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)\cdot\frac{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}} =$$

$a^2 - b^2 = (a-b)(a+b)$

$$= \lim_{n\to+\infty}\frac{(n^2+5n+1)-}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}$$

Rješenje

a)

$$\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)=$$

$\infty - \infty$

$$=\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)\cdot\frac{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}=$$

$a^2-b^2=(a-b)(a+b)$

$$=\lim_{n\to+\infty}\frac{(n^2+5n+1)-(n^2-n)}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}$$

Rješenje

a)

$$\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)=$$

$\infty-\infty$

$$=\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)\cdot\frac{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}=$$

$a^2-b^2=(a-b)(a+b)$

$$=\lim_{n\to+\infty}\frac{(n^2+5n+1)-(n^2-n)}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}=$$

$$=\lim_{n\to+\infty}\frac{}{}$$

Rješenje

a)

$$\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)=$$

$\infty-\infty$

$$=\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)\cdot\frac{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}=$$

$a^2-b^2=(a-b)(a+b)$

$$=\lim_{n\to+\infty}\frac{(n^2+5n+1)-(n^2-n)}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}=$$

$$=\lim_{n\to+\infty}\frac{}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}$$

Rješenje

a)

$$\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)=$$

$\infty-\infty$

$$=\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)\cdot\frac{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}=$$

$a^2-b^2=(a-b)(a+b)$

$$=\lim_{n\to+\infty}\frac{(n^2+5n+1)-(n^2-n)}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}=$$

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

Rješenje

a)

$$\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)=$$

$\infty-\infty$

$$=\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)\cdot\frac{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}=$$

$a^2-b^2=(a-b)(a+b)$

$$=\lim_{n\to+\infty}\frac{(n^2+5n+1)-(n^2-n)}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}=$$

$\frac{\infty}{\infty}$

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

Rješenje

a) $\lim\limits_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right) =$ ← $\infty - \infty$

$$= \lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)\cdot\frac{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}} =$$

$a^2-b^2=(a-b)(a$ …

- Najveća potencija u brojniku je n.

$\frac{\infty}{\infty}$ →

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

Rješenje

a) $$\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)=$$

$\infty - \infty$

$$=\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)\cdot\frac{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}{\ldots+\sqrt{n^2-n}}=$$

- Najveća potencija u brojniku je n.
- Najveća potencija u nazivniku je $\sqrt{n^2}=n$.

$a^2-b^2=(a-b)(a$ …

$$\ldots n) \ldots - n =$$

$\frac{\infty}{\infty}$

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

Rješenje

a)

$$\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)=$$

$\infty - \infty$

$$=\lim_{n\to+\infty}\left(\sqrt{n^2 \ldots}\ \ldots\right)\ \frac{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}{\ldots+\sqrt{n^2-n}}=$$

- Najveća potencija u brojniku je n.
- Najveća potencija u nazivniku je $\sqrt{n^2}=n$.
- Dijelimo brojnik i nazivnik s n.

$a^2-b^2=(a-b)(a \ldots$

$$\ldots n)}{\ldots - n}=$$

$\dfrac{\infty}{\infty}$

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

Rješenje

a)

$$\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)=$$

$\infty-\infty$

$$=\lim_{n\to+\infty}\left(\sqrt{n^2 \ldots}\right)\cdot\frac{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}{\ldots+\sqrt{n^2-n}}=$$

$a^2-b^2=(a-b)(a \ldots$

- Najveća potencija u brojniku je n.
- Najveća potencija u nazivniku je $\sqrt{n^2}=n$.
- Dijelimo brojnik i nazivnik s n.

$$\ldots n) \ldots n =$$

$\frac{\infty}{\infty}$

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

Rješenje

a)

$$\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)=$$

$\infty-\infty$

$$=\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)\cdot\frac{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}=$$

$a^2-b^2=(a-b)(a+b)$

$$=\lim_{n\to+\infty}\frac{(n^2+5n+1)-(n^2-n)}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}=$$

$\frac{\infty}{\infty}$

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

$$=\lim_{n\to+\infty}\frac{\quad}{\quad}$$

Rješenje

a)

$$\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)=$$

$\infty-\infty$

$$=\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)\cdot\frac{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}=$$

$a^2-b^2=(a-b)(a+b)$

$$=\lim_{n\to+\infty}\frac{(n^2+5n+1)-(n^2-n)}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}=$$

$\frac{\infty}{\infty}$

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

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

Rješenje

a)

$$\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)=$$

$\infty-\infty$

$$=\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)\cdot\frac{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}=$$

$a^2-b^2=(a-b)(a+b)$

$$=\lim_{n\to+\infty}\frac{(n^2+5n+1)-(n^2-n)}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}=$$

$\frac{\infty}{\infty}$

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

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

$n=\sqrt{n^2}$

Rješenje

a) $$\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)=$$

$\infty-\infty$

$$=\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)\cdot\frac{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}=$$

$a^2-b^2=(a-b)(a+b)$

$$=\lim_{n\to+\infty}\frac{(n^2+5n+1)-(n^2-n)}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}=$$

$\frac{\infty}{\infty}$

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

$$=\lim_{n\to+\infty}\frac{\frac{6n+1}{n}}{\frac{\sqrt{n^2+5n+1}}{\sqrt{n^2}}+\frac{\sqrt{n^2-n}}{\sqrt{n^2}}}=\lim_{n\to+\infty}\frac{\quad}{\quad}$$

$n=\sqrt{n^2}$

Rješenje

a)

$$\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)=$$

$\infty-\infty$

$$=\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)\cdot\frac{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}=$$

$a^2-b^2=(a-b)(a+b)$

$$=\lim_{n\to+\infty}\frac{(n^2+5n+1)-(n^2-n)}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}=$$

$\frac{\infty}{\infty}$

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

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

$n=\sqrt{n^2}$

Rješenje

a)

$$\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)=$$

$\infty-\infty$

$$=\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)\cdot\frac{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}=$$

$a^2-b^2=(a-b)(a+b)$

$$=\lim_{n\to+\infty}\frac{(n^2+5n+1)-(n^2-n)}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}=$$

$\frac{\infty}{\infty}$

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

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

$n=\sqrt{n^2}$

Rješenje

a)

$$\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)=$$

$\infty-\infty$

$$=\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)\cdot\frac{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}=$$

$a^2-b^2=(a-b)(a+b)$

$$=\lim_{n\to+\infty}\frac{(n^2+5n+1)-(n^2-n)}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}=$$

$\frac{\infty}{\infty}$

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

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

$n=\sqrt{n^2}$

$$=\lim_{n\to+\infty}\frac{\quad}{\quad}$$

Rješenje

a) $$\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)=$$ $\infty-\infty$

$$=\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)\cdot\frac{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}=$$

$a^2-b^2=(a-b)(a+b)$

$$=\lim_{n\to+\infty}\frac{(n^2+5n+1)-(n^2-n)}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}=$$

$\frac{\infty}{\infty}$

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

$$=\lim_{n\to+\infty}\frac{\dfrac{6n+1}{n}}{\dfrac{\sqrt{n^2+5n+1}}{\sqrt{n^2}}+\dfrac{\sqrt{n^2-n}}{\sqrt{n^2}}}=\lim_{n\to+\infty}\frac{\dfrac{6n+1}{n}}{\sqrt{\dfrac{n^2+5n+1}{n^2}}+\sqrt{\dfrac{n^2-n}{n^2}}}$$

$n=\sqrt{n^2}$

$$=\lim_{n\to+\infty}\frac{6+\dfrac{1}{n}}{}$$

Rješenje

a)

$$\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)=$$

$\infty-\infty$

$$=\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)\cdot\frac{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}=$$

$a^2-b^2=(a-b)(a+b)$

$$=\lim_{n\to+\infty}\frac{(n^2+5n+1)-(n^2-n)}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}=$$

$\frac{\infty}{\infty}$

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

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

$n=\sqrt{n^2}$

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

Rješenje

a) $$\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)=$$ $\infty-\infty$

$$=\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)\cdot\frac{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}=$$

$a^2-b^2=(a-b)(a+b)$

$$=\lim_{n\to+\infty}\frac{(n^2+5n+1)-(n^2-n)}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}=$$

$\frac{\infty}{\infty}$

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

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

$n=\sqrt{n^2}$

$$=\lim_{n\to+\infty}\frac{6+\frac{1}{n}}{\sqrt{1+\frac{5}{n}+\frac{1}{n^2}}+\sqrt{1-\frac{1}{n}}}=\underline{\hspace{6cm}}$$

Rješenje

a)

$$\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)=$$

$\infty-\infty$

$$=\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)\cdot\frac{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}=$$

$a^2-b^2=(a-b)(a+b)$

$$=\lim_{n\to+\infty}\frac{(n^2+5n+1)-(n^2-n)}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}=$$

$\dfrac{\infty}{\infty}$

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

$$=\lim_{n\to+\infty}\frac{\frac{6n+1}{n}}{\frac{\sqrt{n^2+5n+1}}{\sqrt{n^2}}+\frac{\sqrt{n^2-n}}{\sqrt{n^2}}}=\lim_{n\to+\infty}\frac{\frac{6n+1}{n}}{\ldots}$$

$n=\sqrt{n^2}$

$$\lim_{n\to+\infty}\frac{c}{n^p}=0,\quad c,p\in\mathbb{R},\ p>0$$

$$=\lim_{n\to+\infty}\frac{6+\frac{1}{n}}{\sqrt{1+\frac{5}{n}+\frac{1}{n^2}}+\sqrt{1-\frac{1}{n}}}=\underline{\qquad\qquad}$$

Rješenje

a)

$$\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right) = \qquad \boxed{\infty-\infty}$$

$$= \lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)\cdot\frac{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}} =$$

$\boxed{a^2-b^2=(a-b)(a+b)}$

$$= \lim_{n\to+\infty}\frac{(n^2+5n+1)-(n^2-n)}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}} =$$

$\boxed{\dfrac{\infty}{\infty}}$

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

$$= \lim_{n\to+\infty}\frac{\dfrac{6n+1}{n}}{\dfrac{\sqrt{n^2+5n+1}}{\sqrt{n^2}}+\dfrac{\sqrt{n^2-n}}{\sqrt{n^2}}} = \lim \frac{\dfrac{6n+1}{n}}{\cdots}$$

$n=\sqrt{n^2}$

$$\lim_{n\to+\infty}\frac{c}{n^p}=0, \quad c,p\in\mathbb{R},\ p>0$$

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

Rješenje

a) $\lim\limits_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)=$ ← $\boxed{\infty-\infty}$

$$=\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)\cdot\frac{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}=$$

$\boxed{a^2-b^2=(a-b)(a+b)}$

$$=\lim_{n\to+\infty}\frac{(n^2+5n+1)-(n^2-n)}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}=$$

$\boxed{\dfrac{\infty}{\infty}}$ →

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

$$=\lim_{n\to+\infty}\frac{\dfrac{6n+1}{n}}{\dfrac{\sqrt{n^2+5n+1}}{\sqrt{n^2}}+\dfrac{\sqrt{n^2-n}}{\sqrt{n^2}}}=\lim\frac{\dfrac{6n+1}{n}}{\cdots}$$

$n=\sqrt{n^2}$

$$\boxed{\lim_{n\to+\infty}\frac{c}{n^p}=0,\qquad c,p\in\mathbb{R},\ p>0}$$

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

Rješenje

a)

$$\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)=$$

$\infty-\infty$

$$=\lim_{n\to+\infty}\left(\sqrt{n^2+5n+1}-\sqrt{n^2-n}\right)\cdot\frac{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}=$$

$a^2-b^2=(a-b)(a+b)$

$$=\lim_{n\to+\infty}\frac{(n^2+5n+1)-(n^2-n)}{\sqrt{n^2+5n+1}+\sqrt{n^2-n}}=$$

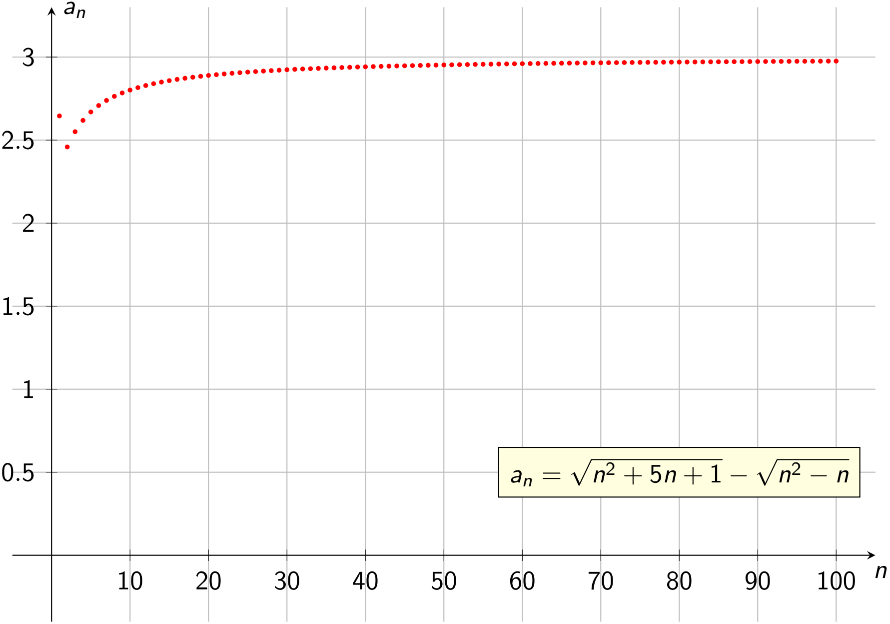
$\frac{\infty}{\infty}$

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

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

$n=\sqrt{n^2}$

$$=\lim_{n\to+\infty}\frac{6+\frac{1}{n}}{\sqrt{1+\frac{5}{n}+\frac{1}{n^2}}+\sqrt{1-\frac{1}{n}}}=\frac{6+0}{\sqrt{1+0+0}+\sqrt{1-0}}=3$$



a_n
3
2.5
2
1.5
1
0.5
10
20
30
40
50
60
70
80
90
100
n
$a_n = \sqrt{n^2 + 5n + 1} - \sqrt{n^2 - n}$

b)

$$\lim_{n \to +\infty} \left(\sqrt{6n - 5} - \sqrt{n + 2} \right) =$$

b)

$$\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)=$$

$\infty - \infty$

b) $$\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)=$$

$\infty - \infty$

$a^2 - b^2 = (a-b)(a+b)$

b)

$\infty - \infty$

$a^2 - b^2 = (a-b)(a+b)$

$$\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right) =$$

$$= \lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)$$

b)

$$\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)=$$

$\infty - \infty$

$a^2 - b^2 = (a-b)(a+b)$

$$=\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)\cdot \underline{\hspace{6cm}}$$

b)

$$\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)=$$

$\infty-\infty$

$a^2-b^2=(a-b)(a+b)$

$$=\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)\cdot\frac{\sqrt{6n-5}+\sqrt{n+2}}{}$$

b)

$$\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)=$$

$\infty - \infty$

$a^2 - b^2 = (a-b)(a+b)$

$$=\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)\cdot\frac{\sqrt{6n-5}+\sqrt{n+2}}{\sqrt{6n-5}+\sqrt{n+2}}$$

b)

$$\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)=$$

$\infty - \infty$

$a^2 - b^2 = (a-b)(a+b)$

$$=\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)\cdot\frac{\sqrt{6n-5}+\sqrt{n+2}}{\sqrt{6n-5}+\sqrt{n+2}}=$$

$$=\lim_{n\to+\infty}\frac{}{}$$

b)

$$\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)=$$

$\infty - \infty$

$a^2 - b^2 = (a-b)(a+b)$

$$=\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)\cdot\frac{\sqrt{6n-5}+\sqrt{n+2}}{\sqrt{6n-5}+\sqrt{n+2}}=$$

$$=\lim_{n\to+\infty}\frac{}{\sqrt{6n-5}+\sqrt{n+2}}$$

b)

$\infty - \infty$

$a^2 - b^2 = (a-b)(a+b)$

$$\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)=$$

$$=\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)\cdot\frac{\sqrt{6n-5}+\sqrt{n+2}}{\sqrt{6n-5}+\sqrt{n+2}}=$$

$$=\lim_{n\to+\infty}\frac{(6n-5)}{\sqrt{6n-5}+\sqrt{n+2}}$$

b)

$\infty - \infty$

$a^2 - b^2 = (a-b)(a+b)$

$$\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)=$$

$$=\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)\cdot\frac{\sqrt{6n-5}+\sqrt{n+2}}{\sqrt{6n-5}+\sqrt{n+2}}=$$

$$=\lim_{n\to+\infty}\frac{(6n-5)-}{\sqrt{6n-5}+\sqrt{n+2}}$$

b)

$$\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)=$$

$\infty - \infty$

$a^2 - b^2 = (a-b)(a+b)$

$$=\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)\cdot\frac{\sqrt{6n-5}+\sqrt{n+2}}{\sqrt{6n-5}+\sqrt{n+2}}=$$

$$=\lim_{n\to+\infty}\frac{(6n-5)-(n+2)}{\sqrt{6n-5}+\sqrt{n+2}}$$

b)

$\infty - \infty$

$a^2 - b^2 = (a-b)(a+b)$

$$\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right) =$$

$$= \lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)\cdot\frac{\sqrt{6n-5}+\sqrt{n+2}}{\sqrt{6n-5}+\sqrt{n+2}} =$$

$$= \lim_{n\to+\infty}\frac{(6n-5)-(n+2)}{\sqrt{6n-5}+\sqrt{n+2}} = \lim_{n\to+\infty} \rule{6cm}{0.4pt}$$

b)

$$\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)=$$

$\infty - \infty$

$a^2 - b^2 = (a-b)(a+b)$

$$=\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)\cdot\frac{\sqrt{6n-5}+\sqrt{n+2}}{\sqrt{6n-5}+\sqrt{n+2}}=$$

$$=\lim_{n\to+\infty}\frac{(6n-5)-(n+2)}{\sqrt{6n-5}+\sqrt{n+2}}=\lim_{n\to+\infty}\frac{}{\sqrt{6n-5}+\sqrt{n+2}}$$

b)

$\infty - \infty$

$a^2 - b^2 = (a-b)(a+b)$

$$\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)=$$

$$=\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)\cdot\frac{\sqrt{6n-5}+\sqrt{n+2}}{\sqrt{6n-5}+\sqrt{n+2}}=$$

$$=\lim_{n\to+\infty}\frac{(6n-5)-(n+2)}{\sqrt{6n-5}+\sqrt{n+2}}=\lim_{n\to+\infty}\frac{5n-7}{\sqrt{6n-5}+\sqrt{n+2}}$$

b)

$\infty - \infty$

$a^2 - b^2 = (a-b)(a+b)$

$$\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)=$$

$$=\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)\cdot\frac{\sqrt{6n-5}+\sqrt{n+2}}{\sqrt{6n-5}+\sqrt{n+2}}=$$

$\frac{\infty}{\infty}$

$$=\lim_{n\to+\infty}\frac{(6n-5)-(n+2)}{\sqrt{6n-5}+\sqrt{n+2}}=\lim_{n\to+\infty}\frac{5n-7}{\sqrt{6n-5}+\sqrt{n+2}}$$

b)

$$\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)=$$

$\infty - \infty$

$a^2 - b^2 = (a-b)(a+b)$

$$=\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)\cdot\frac{\sqrt{6n-5}+\sqrt{n+2}}{\sqrt{6n-5}+\sqrt{n+2}}=$$

$\frac{\infty}{\infty}$

$$=\lim_{n\to+\infty}\frac{(6n-5)-(n+2)}{\sqrt{6n-5}+\sqrt{n+2}}=\lim_{n\to+\infty}\frac{5n-7}{\sqrt{6n-5}+\sqrt{n+2}}$$

- Najveća potencija u brojniku je n.

b)

$$\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)=$$

$\infty - \infty$

$a^2 - b^2 = (a-b)(a+b)$

$$=\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)\cdot\frac{\sqrt{6n-5}+\sqrt{n+2}}{\sqrt{6n-5}+\sqrt{n+2}}=$$

$\frac{\infty}{\infty}$

$$=\lim_{n\to+\infty}\frac{(6n-5)-(n+2)}{\sqrt{6n-5}+\sqrt{n+2}}=\lim_{n\to+\infty}\frac{5n-7}{\sqrt{6n-5}+\sqrt{n+2}}$$

- Najveća potencija u brojniku je n.
- Najveća potencija u nazivniku je $\sqrt{n}$.

b)

$$\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)=$$

$\infty-\infty$

$a^2-b^2=(a-b)(a+b)$

$$=\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)\cdot\frac{\sqrt{6n-5}+\sqrt{n+2}}{\sqrt{6n-5}+\sqrt{n+2}}=$$

$$=\lim_{n\to+\infty}\frac{(6n-5)-(n+2)}{\sqrt{6n-5}+\sqrt{n+2}}=\lim_{n\to+\infty}\frac{5n-7}{\sqrt{6n-5}+\sqrt{n+2}}$$

$\frac{\infty}{\infty}$

- Najveća potencija u brojniku je n.
- Najveća potencija u nazivniku je $\sqrt{n}$.
- Dijelimo brojnik i nazivnik s n.

b)

$$\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)=$$

$\infty-\infty$

$a^2-b^2=(a-b)(a+b)$

$$=\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)\cdot\frac{\sqrt{6n-5}+\sqrt{n+2}}{\sqrt{6n-5}+\sqrt{n+2}}=$$

$\frac{\infty}{\infty}$

$$=\lim_{n\to+\infty}\frac{(6n-5)-(n+2)}{\sqrt{6n-5}+\sqrt{n+2}}=\lim_{n\to+\infty}\frac{5n-7\;/:n}{\sqrt{6n-5}+\sqrt{n+2}\;/:n}$$

- Najveća potencija u brojniku je n.
- Najveća potencija u nazivniku je $\sqrt{n}$.
- Dijelimo brojnik i nazivnik s n.

b)

$$\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)=$$

$\infty-\infty$

$a^2-b^2=(a-b)(a+b)$

$$=\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)\cdot\frac{\sqrt{6n-5}+\sqrt{n+2}}{\sqrt{6n-5}+\sqrt{n+2}}=$$

$\frac{\infty}{\infty}$

$$=\lim_{n\to+\infty}\frac{(6n-5)-(n+2)}{\sqrt{6n-5}+\sqrt{n+2}}=\lim_{n\to+\infty}\frac{5n-7\ /:n}{\sqrt{6n-5}+\sqrt{n+2}\ /:n}=$$

$$=\lim_{n\to+\infty}\frac{\qquad}{\qquad}$$

b)

$$\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)=$$

$\infty-\infty$

$a^2-b^2=(a-b)(a+b)$

$$=\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)\cdot\frac{\sqrt{6n-5}+\sqrt{n+2}}{\sqrt{6n-5}+\sqrt{n+2}}=$$

$\dfrac{\infty}{\infty}$

$$=\lim_{n\to+\infty}\frac{(6n-5)-(n+2)}{\sqrt{6n-5}+\sqrt{n+2}}=\lim_{n\to+\infty}\frac{5n-7\ /:n}{\sqrt{6n-5}+\sqrt{n+2}\ /:n}=$$

$$=\lim_{n\to+\infty}\frac{\frac{5n-7}{n}}{}$$

b)

$$\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)=$$

$\infty-\infty$

$a^2-b^2=(a-b)(a+b)$

$$=\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)\cdot\frac{\sqrt{6n-5}+\sqrt{n+2}}{\sqrt{6n-5}+\sqrt{n+2}}=$$

$\frac{\infty}{\infty}$

$$=\lim_{n\to+\infty}\frac{(6n-5)-(n+2)}{\sqrt{6n-5}+\sqrt{n+2}}=\lim_{n\to+\infty}\frac{5n-7\ /:n}{\sqrt{6n-5}+\sqrt{n+2}\ /:n}=$$

$$=\lim_{n\to+\infty}\frac{\frac{5n-7}{n}}{\frac{\sqrt{6n-5}}{\sqrt{n^2}}+\frac{\sqrt{n+2}}{\sqrt{n^2}}}$$

$n=\sqrt{n^2}$

b)

$$\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)=$$

$\infty-\infty$

$a^2-b^2=(a-b)(a+b)$

$$=\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)\cdot\frac{\sqrt{6n-5}+\sqrt{n+2}}{\sqrt{6n-5}+\sqrt{n+2}}=$$

$\frac{\infty}{\infty}$

$$=\lim_{n\to+\infty}\frac{(6n-5)-(n+2)}{\sqrt{6n-5}+\sqrt{n+2}}=\lim_{n\to+\infty}\frac{5n-7\ /:n}{\sqrt{6n-5}+\sqrt{n+2}\ /:n}=$$

$$=\lim_{n\to+\infty}\frac{\frac{5n-7}{n}}{\frac{\sqrt{6n-5}}{\sqrt{n^2}}+\frac{\sqrt{n+2}}{\sqrt{n^2}}}=\lim_{n\to+\infty}\frac{\qquad}{\qquad}$$

$n=\sqrt{n^2}$

b)

$$\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)=$$

$\infty-\infty$

$a^2-b^2=(a-b)(a+b)$

$$=\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)\cdot\frac{\sqrt{6n-5}+\sqrt{n+2}}{\sqrt{6n-5}+\sqrt{n+2}}=$$

$\frac{\infty}{\infty}$

$$=\lim_{n\to+\infty}\frac{(6n-5)-(n+2)}{\sqrt{6n-5}+\sqrt{n+2}}=\lim_{n\to+\infty}\frac{5n-7\ /:n}{\sqrt{6n-5}+\sqrt{n+2}\ /:n}=$$

$$=\lim_{n\to+\infty}\frac{\frac{5n-7}{n}}{\frac{\sqrt{6n-5}}{\sqrt{n^2}}+\frac{\sqrt{n+2}}{\sqrt{n^2}}}=\lim_{n\to+\infty}\frac{\frac{5n-7}{n}}{}$$

$n=\sqrt{n^2}$

b)

$\infty - \infty$

$a^2 - b^2 = (a-b)(a+b)$

$$\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right) =$$

$$= \lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)\cdot\frac{\sqrt{6n-5}+\sqrt{n+2}}{\sqrt{6n-5}+\sqrt{n+2}} =$$

$\frac{\infty}{\infty}$

$$= \lim_{n\to+\infty}\frac{(6n-5)-(n+2)}{\sqrt{6n-5}+\sqrt{n+2}} = \lim_{n\to+\infty}\frac{5n-7 \;/:n}{\sqrt{6n-5}+\sqrt{n+2}\;/:n} =$$

$$= \lim_{n\to+\infty}\frac{\frac{5n-7}{n}}{\frac{\sqrt{6n-5}}{\sqrt{n^2}}+\frac{\sqrt{n+2}}{\sqrt{n^2}}} = \lim_{n\to+\infty}\frac{\frac{5n-7}{n}}{\sqrt{\frac{6n-5}{n^2}}+\sqrt{\frac{n+2}{n^2}}}$$

$n = \sqrt{n^2}$

b)

$\infty - \infty$

$a^2 - b^2 = (a-b)(a+b)$

$$\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right) =$$

$$= \lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)\cdot\frac{\sqrt{6n-5}+\sqrt{n+2}}{\sqrt{6n-5}+\sqrt{n+2}} =$$

$\frac{\infty}{\infty}$

$$= \lim_{n\to+\infty}\frac{(6n-5)-(n+2)}{\sqrt{6n-5}+\sqrt{n+2}} = \lim_{n\to+\infty}\frac{5n-7 \;/ : n}{\sqrt{6n-5}+\sqrt{n+2} \;/ : n} =$$

$$= \lim_{n\to+\infty}\frac{\frac{5n-7}{n}}{\frac{\sqrt{6n-5}}{\sqrt{n^2}}+\frac{\sqrt{n+2}}{\sqrt{n^2}}} = \lim_{n\to+\infty}\frac{\frac{5n-7}{n}}{\sqrt{\frac{6n-5}{n^2}}+\sqrt{\frac{n+2}{n^2}}} =$$

$n = \sqrt{n^2}$

$$= \lim_{n\to+\infty}\frac{\quad}{\quad}$$

b)

$$\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)=$$

$\infty-\infty$

$a^2-b^2=(a-b)(a+b)$

$$=\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)\cdot\frac{\sqrt{6n-5}+\sqrt{n+2}}{\sqrt{6n-5}+\sqrt{n+2}}=$$

$\frac{\infty}{\infty}$

$$=\lim_{n\to+\infty}\frac{(6n-5)-(n+2)}{\sqrt{6n-5}+\sqrt{n+2}}=\lim_{n\to+\infty}\frac{5n-7\ /:n}{\sqrt{6n-5}+\sqrt{n+2}\ /:n}=$$

$$=\lim_{n\to+\infty}\frac{\frac{5n-7}{n}}{\frac{\sqrt{6n-5}}{\sqrt{n^2}}+\frac{\sqrt{n+2}}{\sqrt{n^2}}}=\lim_{n\to+\infty}\frac{\frac{5n-7}{n}}{\sqrt{\frac{6n-5}{n^2}}+\sqrt{\frac{n+2}{n^2}}}=$$

$n=\sqrt{n^2}$

$$=\lim_{n\to+\infty}\frac{5-\frac{7}{n}}{}$$

b)

$\infty - \infty$

$a^2 - b^2 = (a-b)(a+b)$

$$\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right) =$$

$$= \lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)\cdot\frac{\sqrt{6n-5}+\sqrt{n+2}}{\sqrt{6n-5}+\sqrt{n+2}} =$$

$\frac{\infty}{\infty}$

$$= \lim_{n\to+\infty}\frac{(6n-5)-(n+2)}{\sqrt{6n-5}+\sqrt{n+2}} = \lim_{n\to+\infty}\frac{5n-7\ \ /:n}{\sqrt{6n-5}+\sqrt{n+2}\ \ /:n} =$$

$$= \lim_{n\to+\infty}\frac{\frac{5n-7}{n}}{\frac{\sqrt{6n-5}}{\sqrt{n^2}}+\frac{\sqrt{n+2}}{\sqrt{n^2}}} = \lim_{n\to+\infty}\frac{\frac{5n-7}{n}}{\sqrt{\frac{6n-5}{n^2}}+\sqrt{\frac{n+2}{n^2}}} =$$

$n = \sqrt{n^2}$

$$= \lim_{n\to+\infty}\frac{5-\frac{7}{n}}{\sqrt{\frac{6}{n}-\frac{5}{n^2}}+\sqrt{\frac{1}{n}+\frac{2}{n^2}}}$$

b)

$$\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)=$$

$\infty-\infty$

$a^2-b^2=(a-b)(a+b)$

$$=\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)\cdot\frac{\sqrt{6n-5}+\sqrt{n+2}}{\sqrt{6n-5}+\sqrt{n+2}}=$$

$\dfrac{\infty}{\infty}$

$$=\lim_{n\to+\infty}\frac{(6n-5)-(n+2)}{\sqrt{6n-5}+\sqrt{n+2}}=\lim_{n\to+\infty}\frac{5n-7\ /:n}{\sqrt{6n-5}+\sqrt{n+2}\ /:n}=$$

$$=\lim_{n\to+\infty}\frac{\frac{5n-7}{n}}{\frac{\sqrt{6n-5}}{\sqrt{n^2}}+\frac{\sqrt{n+2}}{\sqrt{n^2}}}=\lim_{n\to+\infty}\frac{\frac{5n-7}{n}}{\sqrt{\frac{6n-5}{n^2}}+\sqrt{\frac{n+2}{n^2}}}=$$

$n=\sqrt{n^2}$

$$=\lim_{n\to+\infty}\frac{5-\frac{7}{n}}{\sqrt{\frac{6}{n}-\frac{5}{n^2}}+\sqrt{\frac{1}{n}+\frac{2}{n^2}}}=\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_$$

b)

$$\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)=$$

$\infty-\infty$

$a^2-b^2=(a-b)(a+b)$

$$=\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)\cdot\frac{\sqrt{6n-5}+\sqrt{n+2}}{\sqrt{6n-5}+\sqrt{n+2}}=$$

$\dfrac{\infty}{\infty}$

$$=\lim_{n\to+\infty}\frac{(6n-5)-(n+2)}{\sqrt{6n-5}+\sqrt{n+2}}=\lim_{n\to+\infty}\frac{5n-7\ /:n}{\sqrt{6n-5}+\sqrt{n+2}\ /:n}=$$

$$=\lim_{n\to+\infty}\frac{\dfrac{5n-7}{n}}{\dfrac{\sqrt{6n-5}}{\sqrt{n^2}}+\dfrac{\sqrt{n+2}}{\sqrt{n^2}}}=\lim_{n\to+\infty}\frac{\dfrac{5n-7}{n}}{\sqrt{\dfrac{6n-5}{\ }}+\sqrt{\dfrac{n+2}{\ }}}=$$

$n=\sqrt{n^2}$

$$\lim_{n\to+\infty}\frac{c}{n^p}=0,\qquad c,p\in\mathbb{R},\ p>0$$

$$=\lim_{n\to+\infty}\frac{5-\dfrac{7}{n}}{\sqrt{\dfrac{6}{n}-\dfrac{5}{n^2}}+\sqrt{\dfrac{1}{n}+\dfrac{2}{n^2}}}=\underline{\qquad\qquad}$$

b)

$\infty - \infty$

$a^2 - b^2 = (a-b)(a+b)$

$$\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right) =$$

$$= \lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)\cdot\frac{\sqrt{6n-5}+\sqrt{n+2}}{\sqrt{6n-5}+\sqrt{n+2}} =$$

$\frac{\infty}{\infty}$

$$= \lim_{n\to+\infty}\frac{(6n-5)-(n+2)}{\sqrt{6n-5}+\sqrt{n+2}} = \lim_{n\to+\infty}\frac{5n-7 \;/:n}{\sqrt{6n-5}+\sqrt{n+2}\;/:n} =$$

$$= \lim_{n\to+\infty}\frac{\frac{5n-7}{n}}{\frac{\sqrt{6n-5}}{\sqrt{n^2}}+\frac{\sqrt{n+2}}{\sqrt{n^2}}} = \lim_{n\to+\infty}\frac{\frac{5n-7}{n}}{\sqrt{\frac{6n-5}{n^2}}+\sqrt{\frac{n+2}{n^2}}} =$$

$n = \sqrt{n^2}$

$$\lim_{n\to+\infty}\frac{c}{n^p} = 0, \quad c, p \in \mathbb{R},\ p > 0$$

$$= \lim_{n\to+\infty}\frac{5-\frac{7}{n}}{\sqrt{\frac{6}{n}-\frac{5}{n^2}}+\sqrt{\frac{1}{n}+\frac{2}{n^2}}} = \frac{5-0}{}$$

b)

$$\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)=$$

$\infty - \infty$

$a^2-b^2=(a-b)(a+b)$

$$=\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)\cdot\frac{\sqrt{6n-5}+\sqrt{n+2}}{\sqrt{6n-5}+\sqrt{n+2}}=$$

$\frac{\infty}{\infty}$

$$=\lim_{n\to+\infty}\frac{(6n-5)-(n+2)}{\sqrt{6n-5}+\sqrt{n+2}}=\lim_{n\to+\infty}\frac{5n-7 \;/:n}{\sqrt{6n-5}+\sqrt{n+2}\;/:n}=$$

$$=\lim_{n\to+\infty}\frac{\frac{5n-7}{n}}{\frac{\sqrt{6n-5}}{\sqrt{n^2}}+\frac{\sqrt{n+2}}{\sqrt{n^2}}}=\lim_{n\to+\infty}\frac{\frac{5n-7}{n}}{\sqrt{\frac{6n-5}{n^2}}+\sqrt{\frac{n+2}{n^2}}}=$$

$n=\sqrt{n^2}$

$$\lim_{n\to+\infty}\frac{c}{n^p}=0,\quad c,p\in\mathbb{R},\ p>0$$

$$=\lim_{n\to+\infty}\frac{5-\frac{7}{n}}{\sqrt{\frac{6}{n}-\frac{5}{n^2}}+\sqrt{\frac{1}{n}+\frac{2}{n^2}}}=\frac{5-0}{\sqrt{0-0}+\sqrt{0+0}}$$

b)

$$\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)=$$

$\infty-\infty$

$a^2-b^2=(a-b)(a+b)$

$$=\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)\cdot\frac{\sqrt{6n-5}+\sqrt{n+2}}{\sqrt{6n-5}+\sqrt{n+2}}=$$

$\frac{\infty}{\infty}$

$$=\lim_{n\to+\infty}\frac{(6n-5)-(n+2)}{\sqrt{6n-5}+\sqrt{n+2}}=\lim_{n\to+\infty}\frac{5n-7\ /:n}{\sqrt{6n-5}+\sqrt{n+2}\ /:n}=$$

$$=\lim_{n\to+\infty}\frac{\frac{5n-7}{n}}{\frac{\sqrt{6n-5}}{\sqrt{n^2}}+\frac{\sqrt{n+2}}{\sqrt{n^2}}}=\lim_{n\to+\infty}\frac{\frac{5n-7}{n}}{\sqrt{\frac{6n-5}{n^2}}+\sqrt{\frac{n+2}{n^2}}}=$$

$n=\sqrt{n^2}$

$$\lim_{n\to+\infty}\frac{c}{n^p}=0,\quad c,p\in\mathbb{R},\ p>0$$

$$=\lim_{n\to+\infty}\frac{5-\frac{7}{n}}{\sqrt{\frac{6}{n}-\frac{5}{n^2}}+\sqrt{\frac{1}{n}+\frac{2}{n^2}}}=\frac{5-0}{\sqrt{0-0}+\sqrt{0+0}}=\frac{5}{0+}$$

b)

$$\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)=$$

$\infty-\infty$

$a^2-b^2=(a-b)(a+b)$

$$=\lim_{n\to+\infty}\left(\sqrt{6n-5}-\sqrt{n+2}\right)\cdot\frac{\sqrt{6n-5}+\sqrt{n+2}}{\sqrt{6n-5}+\sqrt{n+2}}=$$

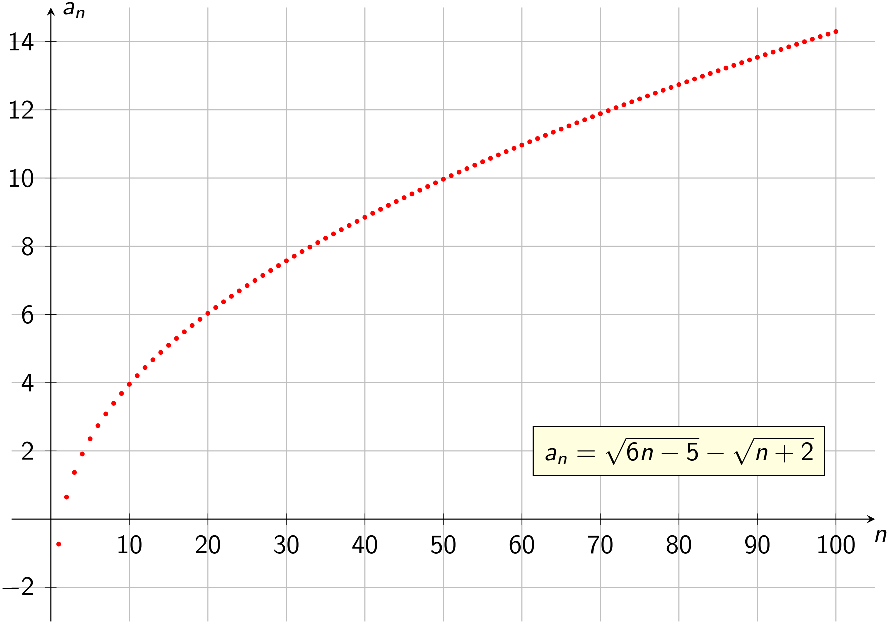
$\frac{\infty}{\infty}$

$$=\lim_{n\to+\infty}\frac{(6n-5)-(n+2)}{\sqrt{6n-5}+\sqrt{n+2}}=\lim_{n\to+\infty}\frac{5n-7\ /:n}{\sqrt{6n-5}+\sqrt{n+2}\ /:n}=$$

$$=\lim_{n\to+\infty}\frac{\frac{5n-7}{n}}{\frac{\sqrt{6n-5}}{\sqrt{n^2}}+\frac{\sqrt{n+2}}{\sqrt{n^2}}}=\lim_{n\to+\infty}\frac{\frac{5n-7}{n}}{\sqrt{\frac{6n-5}{n^2}}+\sqrt{\frac{n+2}{n^2}}}=$$

$n=\sqrt{n^2}$

$$=\lim_{n\to+\infty}\frac{5-\frac{7}{n}}{\sqrt{\frac{6}{n}-\frac{5}{n^2}}+\sqrt{\frac{1}{n}+\frac{2}{n^2}}}=\frac{5-0}{\sqrt{0-0}+\sqrt{0+0}}=\frac{5}{0+}=+\infty$$


a_n
14
12
10
8
6
4
2
−2
10
20
30
40
50
60
70
80
90
100
n
$a_n = \sqrt{6n-5} - \sqrt{n+2}$

c)

$$\lim_{n \to +\infty} \frac{3 - 4 \cdot 5^n}{5 \cdot 3^{n+1} + 6 \cdot 5^{n-1}} =$$

c)

$$\lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^{n+1}+6\cdot 5^{n-1}} = \lim_{n\to+\infty} \frac{\qquad}{\qquad}$$

c)

$$\lim_{n \to +\infty} \frac{3 - 4 \cdot 5^n}{5 \cdot 3^{n+1} + 6 \cdot 5^{n-1}} = \lim_{n \to +\infty} \frac{3 - 4 \cdot 5^n}{\qquad\qquad}$$

c)

$$\lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^{n+1}+6\cdot 5^{n-1}} = \lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot}$$

c)

$$\lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^{n+1}+6\cdot 5^{n-1}} = \lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^n\cdot 3 \qquad\qquad\qquad}$$

c)

$$\lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^{n+1}+6\cdot 5^{n-1}} = \lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^n\cdot 3+6\cdot \qquad\qquad}$$

c)

$$\lim_{n\to+\infty} \frac{3 - 4\cdot 5^n}{5\cdot 3^{n+1} + 6\cdot 5^{n-1}} = \lim_{n\to+\infty} \frac{3 - 4\cdot 5^n}{5\cdot 3^n \cdot 3 + 6\cdot 5^n \cdot 5^{-1}}$$

c)

$$\lim_{n \to +\infty} \frac{3 - 4 \cdot 5^n}{5 \cdot 3^{n+1} + 6 \cdot 5^{n-1}} = \lim_{n \to +\infty} \frac{3 - 4 \cdot 5^n}{5 \cdot 3^n \cdot 3 + 6 \cdot 5^n \cdot 5^{-1}} =$$

$$= \lim_{n \to +\infty} \frac{}{}$$

c)

$$\lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^{n+1}+6\cdot 5^{n-1}} = \lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^n\cdot 3+6\cdot 5^n\cdot 5^{-1}} =$$

$$= \lim_{n\to+\infty} \frac{3-4\cdot 5^n}{}$$

c)

$$\lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^{n+1}+6\cdot 5^{n-1}} = \lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^n\cdot 3+6\cdot 5^n\cdot 5^{-1}} =$$

$$= \lim_{n\to+\infty} \frac{3-4\cdot 5^n}{15\cdot 3^n}$$

c)

$$\lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^{n+1}+6\cdot 5^{n-1}} = \lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^n\cdot 3+6\cdot 5^n\cdot 5^{-1}} =$$

$$= \lim_{n\to+\infty} \frac{3-4\cdot 5^n}{15\cdot 3^n +}$$

c)

$$\lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^{n+1}+6\cdot 5^{n-1}} = \lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^n\cdot 3+6\cdot 5^n\cdot 5^{-1}} =$$

$$= \lim_{n\to+\infty} \frac{3-4\cdot 5^n}{15\cdot 3^n+\frac{6}{5}\cdot 5^n}$$

c)

$$\lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^{n+1}+6\cdot 5^{n-1}} = \lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^n\cdot 3+6\cdot 5^n\cdot 5^{-1}} =$$

$$\frac{\infty}{\infty}$$

$$= \lim_{n\to+\infty} \frac{3-4\cdot 5^n}{15\cdot 3^n+\frac{6}{5}\cdot 5^n}$$

c)

$$\lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^{n+1}+6\cdot 5^{n-1}} = \lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^n\cdot 3+6\cdot 5^n\cdot 5^{-1}} =$$

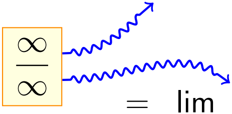
$$\frac{\infty}{\infty}$$

$$= \lim_{n\to+\infty} \frac{3-4\cdot 5^n}{15\cdot 3^n+\frac{6}{5}\cdot 5^n}$$

- U brojniku i nazivniku se javljaju potencije 3^n i 5^n.

c)

$$\lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^{n+1}+6\cdot 5^{n-1}} = \lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^n\cdot 3+6\cdot 5^n\cdot 5^{-1}} =$$



$$= \lim_{n\to+\infty} \frac{3-4\cdot 5^n}{15\cdot 3^n+\frac{6}{5}\cdot 5^n}$$

- U brojniku i nazivniku se javljaju potencije 3^n i 5^n.
- Dijelimo brojnik i nazivnik s potencijom koja ima najveću bazu.

c)

$$\lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^{n+1}+6\cdot 5^{n-1}} = \lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^n\cdot 3+6\cdot 5^n\cdot 5^{-1}} =$$

$$\frac{\infty}{\infty}$$

$$= \lim_{n\to+\infty} \frac{3-4\cdot 5^n}{15\cdot 3^n+\frac{6}{5}\cdot 5^n}$$

- U brojniku i nazivniku se javljaju potencije 3^n i 5^n.
- Dijelimo brojnik i nazivnik s potencijom koja ima najveću bazu.
- Dakle, u ovom slučaju dijelimo brojnik i nazivnik s 5^n.

c)

$$\lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^{n+1}+6\cdot 5^{n-1}} = \lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^n\cdot 3+6\cdot 5^n\cdot 5^{-1}} =$$

$\frac{\infty}{\infty}$

$$= \lim_{n\to+\infty} \frac{3-4\cdot 5^n}{15\cdot 3^n+\frac{6}{5}\cdot 5^n} = \lim_{n\to+\infty} \frac{}{}$$

- U brojniku i nazivniku se javljaju potencije 3^n i 5^n.
- Dijelimo brojnik i nazivnik s potencijom koja ima najveću bazu.
- Dakle, u ovom slučaju dijelimo brojnik i nazivnik s 5^n.

c)

$$\lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^{n+1}+6\cdot 5^{n-1}} = \lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^n\cdot 3+6\cdot 5^n\cdot 5^{-1}} =$$

$\frac{\infty}{\infty}$

$$= \lim_{n\to+\infty} \frac{3-4\cdot 5^n}{15\cdot 3^n+\frac{6}{5}\cdot 5^n} = \lim_{n\to+\infty} \frac{\frac{3-4\cdot 5^n}{5^n}}{}$$

- U brojniku i nazivniku se javljaju potencije 3^n i 5^n.
- Dijelimo brojnik i nazivnik s potencijom koja ima najveću bazu.
- Dakle, u ovom slučaju dijelimo brojnik i nazivnik s 5^n.

c)

$$\lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^{n+1}+6\cdot 5^{n-1}} = \lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^n\cdot 3+6\cdot 5^n\cdot 5^{-1}} =$$

$$\frac{\infty}{\infty}$$

$$= \lim_{n\to+\infty} \frac{3-4\cdot 5^n}{15\cdot 3^n+\frac{6}{5}\cdot 5^n} = \lim_{n\to+\infty} \frac{\frac{3-4\cdot 5^n}{5^n}}{\frac{15\cdot 3^n+\frac{6}{5}\cdot 5^n}{5^n}}$$

- U brojniku i nazivniku se javljaju potencije 3^n i 5^n.
- Dijelimo brojnik i nazivnik s potencijom koja ima najveću bazu.
- Dakle, u ovom slučaju dijelimo brojnik i nazivnik s 5^n.

c)

$$\lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^{n+1}+6\cdot 5^{n-1}} = \lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^n\cdot 3+6\cdot 5^n\cdot 5^{-1}} =$$

$\frac{\infty}{\infty}$

$$= \lim_{n\to+\infty} \frac{3-4\cdot 5^n}{15\cdot 3^n+\frac{6}{5}\cdot 5^n} = \lim_{n\to+\infty} \frac{\frac{3-4\cdot 5^n}{5^n}}{\frac{15\cdot 3^n+\frac{6}{5}\cdot 5^n}{5^n}} =$$

$$= \lim_{n\to+\infty} \frac{}{}$$

c)

$$\lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^{n+1}+6\cdot 5^{n-1}} = \lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^n\cdot 3+6\cdot 5^n\cdot 5^{-1}} =$$

$$\frac{\infty}{\infty}$$

$$= \lim_{n\to+\infty} \frac{3-4\cdot 5^n}{15\cdot 3^n+\frac{6}{5}\cdot 5^n} = \lim_{n\to+\infty} \frac{\dfrac{3-4\cdot 5^n}{5^n}}{\dfrac{15\cdot 3^n+\frac{6}{5}\cdot 5^n}{5^n}} =$$

$$= \lim_{n\to+\infty} \frac{\dfrac{3}{5^n}-4}{}$$

c)

$$\lim_{n\to+\infty}\frac{3-4\cdot 5^n}{5\cdot 3^{n+1}+6\cdot 5^{n-1}} = \lim_{n\to+\infty}\frac{3-4\cdot 5^n}{5\cdot 3^n\cdot 3+6\cdot 5^n\cdot 5^{-1}} =$$

$\dfrac{\infty}{\infty}$

$$= \lim_{n\to+\infty}\frac{3-4\cdot 5^n}{15\cdot 3^n+\frac{6}{5}\cdot 5^n} = \lim_{n\to+\infty}\frac{\dfrac{3-4\cdot 5^n}{5^n}}{\dfrac{15\cdot 3^n+\frac{6}{5}\cdot 5^n}{5^n}} =$$

$$= \lim_{n\to+\infty}\frac{\dfrac{3}{5^n}-4}{15\cdot\dfrac{3^n}{5^n}+\dfrac{6}{5}}$$

c)

$$\lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^{n+1}+6\cdot 5^{n-1}} = \lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^n\cdot 3+6\cdot 5^n\cdot 5^{-1}} =$$

$\frac{\infty}{\infty}$

$$= \lim_{n\to+\infty} \frac{3-4\cdot 5^n}{15\cdot 3^n+\frac{6}{5}\cdot 5^n} = \lim_{n\to+\infty} \frac{\frac{3-4\cdot 5^n}{5^n}}{\frac{15\cdot 3^n+\frac{6}{5}\cdot 5^n}{5^n}} =$$

$$= \lim_{n\to+\infty} \frac{\frac{3}{5^n}-4}{15\cdot\frac{3^n}{5^n}+\frac{6}{5}} = \lim_{n\to+\infty} \frac{\quad}{\quad}$$

c)

$$\lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^{n+1}+6\cdot 5^{n-1}} = \lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^n\cdot 3+6\cdot 5^n\cdot 5^{-1}} =$$

$\frac{\infty}{\infty}$

$$= \lim_{n\to+\infty} \frac{3-4\cdot 5^n}{15\cdot 3^n+\frac{6}{5}\cdot 5^n} = \lim_{n\to+\infty} \frac{\frac{3-4\cdot 5^n}{5^n}}{\frac{15\cdot 3^n+\frac{6}{5}\cdot 5^n}{5^n}} =$$

$$= \lim_{n\to+\infty} \frac{\frac{3}{5^n}-4}{15\cdot\frac{3^n}{5^n}+\frac{6}{5}} = \lim_{n\to+\infty} \frac{3\cdot\left(\frac{1}{5}\right)^n-4}{}$$

c)

$$\lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^{n+1}+6\cdot 5^{n-1}} = \lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^n\cdot 3+6\cdot 5^n\cdot 5^{-1}} =$$

$$\frac{\infty}{\infty}$$

$$= \lim_{n\to+\infty} \frac{3-4\cdot 5^n}{15\cdot 3^n+\frac{6}{5}\cdot 5^n} = \lim_{n\to+\infty} \frac{\dfrac{3-4\cdot 5^n}{5^n}}{\dfrac{15\cdot 3^n+\frac{6}{5}\cdot 5^n}{5^n}} =$$

$$= \lim_{n\to+\infty} \frac{\dfrac{3}{5^n}-4}{15\cdot\dfrac{3^n}{5^n}+\dfrac{6}{5}} = \lim_{n\to+\infty} \frac{3\cdot\left(\dfrac{1}{5}\right)^n-4}{15\cdot\left(\dfrac{3}{5}\right)^n+\dfrac{6}{5}}$$

c)

$$\lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^{n+1}+6\cdot 5^{n-1}} = \lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^n\cdot 3+6\cdot 5^n\cdot 5^{-1}} =$$

$$\frac{\infty}{\infty}$$

$$= \lim_{n\to+\infty} \frac{3-4\cdot 5^n}{15\cdot 3^n+\frac{6}{5}\cdot 5^n} = \lim_{n\to+\infty} \frac{\frac{3-4\cdot 5^n}{5^n}}{\frac{15\cdot 3^n+\frac{6}{5}\cdot 5^n}{5^n}} =$$

$$= \lim_{n\to+\infty} \frac{\frac{3}{5^n}-4}{15\cdot\frac{3^n}{5^n}+\frac{6}{5}} = \lim_{n\to+\infty} \frac{3\cdot\left(\frac{1}{5}\right)^n-4}{15\cdot\left(\frac{3}{5}\right)^n+\frac{6}{5}} =$$

$$= \underline{\qquad\qquad}$$

c)

$$\lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^{n+1}+6\cdot 5^{n-1}} = \lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^n\cdot 3+6\cdot 5^n\cdot 5^{-1}} =$$

$\frac{\infty}{\infty}$

$$= \lim_{n\to+\infty} \frac{3-4\cdot 5^n}{15\cdot 3^n+\frac{6}{5}\cdot 5^n} = \lim_{n\to+\infty} \frac{\frac{3-4\cdot 5^n}{5^n}}{\frac{15\cdot 3^n+\frac{6}{5}\cdot 5^n}{5^n}} =$$

$$= \lim_{n\to+\infty} \frac{\frac{3}{5^n}-4}{15\cdot\frac{3^n}{5^n}+\frac{6}{5}} = \lim_{n\to+\infty} \frac{3\cdot\left(\frac{1}{5}\right)^n-4}{15\cdot\left(\frac{3}{5}\right)^n+\frac{6}{5}} =$$

$$= \underline{\qquad\qquad}$$

$\lim_{n\to+\infty} q^n = 0, \quad |q|<1$

c)

$$\lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^{n+1}+6\cdot 5^{n-1}} = \lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^n\cdot 3+6\cdot 5^n\cdot 5^{-1}} =$$

$\frac{\infty}{\infty}$

$$= \lim_{n\to+\infty} \frac{3-4\cdot 5^n}{15\cdot 3^n+\frac{6}{5}\cdot 5^n} = \lim_{n\to+\infty} \frac{\dfrac{3-4\cdot 5^n}{5^n}}{\dfrac{15\cdot 3^n+\frac{6}{5}\cdot 5^n}{5^n}} =$$

$$= \lim_{n\to+\infty} \frac{\dfrac{3}{5^n}-4}{15\cdot\dfrac{3^n}{5^n}+\dfrac{6}{5}} = \lim_{n\to+\infty} \frac{3\cdot\left(\dfrac{1}{5}\right)^n-4}{15\cdot\left(\dfrac{3}{5}\right)^n+\dfrac{6}{5}} =$$

$$= \frac{3\cdot 0-4}{}$$

$\lim_{n\to+\infty} q^n = 0, \quad |q|<1$

c)

$$\lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^{n+1}+6\cdot 5^{n-1}} = \lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^n\cdot 3+6\cdot 5^n\cdot 5^{-1}} =$$

$$\boxed{\frac{\infty}{\infty}}$$

$$= \lim_{n\to+\infty} \frac{3-4\cdot 5^n}{15\cdot 3^n+\frac{6}{5}\cdot 5^n} = \lim_{n\to+\infty} \frac{\dfrac{3-4\cdot 5^n}{5^n}}{\dfrac{15\cdot 3^n+\frac{6}{5}\cdot 5^n}{5^n}} =$$

$$= \lim_{n\to+\infty} \frac{\dfrac{3}{5^n}-4}{15\cdot\dfrac{3^n}{5^n}+\dfrac{6}{5}} = \lim_{n\to+\infty} \frac{3\cdot\left(\dfrac{1}{5}\right)^n-4}{15\cdot\left(\dfrac{3}{5}\right)^n+\dfrac{6}{5}} =$$

$$= \frac{3\cdot 0-4}{15\cdot 0+\dfrac{6}{5}}$$

$$\boxed{\lim_{n\to+\infty} q^n = 0, \quad |q|<1}$$

c)

$$\lim_{n\to+\infty}\frac{3-4\cdot 5^n}{5\cdot 3^{n+1}+6\cdot 5^{n-1}} = \lim_{n\to+\infty}\frac{3-4\cdot 5^n}{5\cdot 3^n\cdot 3+6\cdot 5^n\cdot 5^{-1}} =$$

$$\boxed{\frac{\infty}{\infty}}$$

$$= \lim_{n\to+\infty}\frac{3-4\cdot 5^n}{15\cdot 3^n+\frac{6}{5}\cdot 5^n} = \lim_{n\to+\infty}\frac{\frac{3-4\cdot 5^n}{5^n}}{\frac{15\cdot 3^n+\frac{6}{5}\cdot 5^n}{5^n}} =$$

$$= \lim_{n\to+\infty}\frac{\frac{3}{5^n}-4}{15\cdot\frac{3^n}{5^n}+\frac{6}{5}} = \lim_{n\to+\infty}\frac{3\cdot\left(\frac{1}{5}\right)^n-4}{15\cdot\left(\frac{3}{5}\right)^n+\frac{6}{5}} =$$

$$= \frac{3\cdot 0-4}{15\cdot 0+\frac{6}{5}} = \frac{-4}{\frac{6}{5}}$$

$$\boxed{\lim_{n\to+\infty} q^n = 0, \quad |q|<1}$$

c)

$$\lim_{n\to+\infty}\frac{3-4\cdot 5^n}{5\cdot 3^{n+1}+6\cdot 5^{n-1}} = \lim_{n\to+\infty}\frac{3-4\cdot 5^n}{5\cdot 3^n\cdot 3+6\cdot 5^n\cdot 5^{-1}} =$$

$\dfrac{\infty}{\infty}$

$$= \lim_{n\to+\infty}\frac{3-4\cdot 5^n}{15\cdot 3^n+\frac{6}{5}\cdot 5^n} = \lim_{n\to+\infty}\frac{\dfrac{3-4\cdot 5^n}{5^n}}{\dfrac{15\cdot 3^n+\frac{6}{5}\cdot 5^n}{5^n}} =$$

$$= \lim_{n\to+\infty}\frac{\dfrac{3}{5^n}-4}{15\cdot\dfrac{3^n}{5^n}+\dfrac{6}{5}} = \lim_{n\to+\infty}\frac{3\cdot\left(\dfrac{1}{5}\right)^n-4}{15\cdot\left(\dfrac{3}{5}\right)^n+\dfrac{6}{5}} =$$

$$= \frac{3\cdot 0-4}{15\cdot 0+\dfrac{6}{5}} = \frac{-4}{\dfrac{6}{5}} = \frac{-4\cdot 5}{6}$$

$\lim\limits_{n\to+\infty} q^n = 0, \quad |q|<1$

c)

$$\lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^{n+1}+6\cdot 5^{n-1}} = \lim_{n\to+\infty} \frac{3-4\cdot 5^n}{5\cdot 3^n\cdot 3+6\cdot 5^n\cdot 5^{-1}} =$$

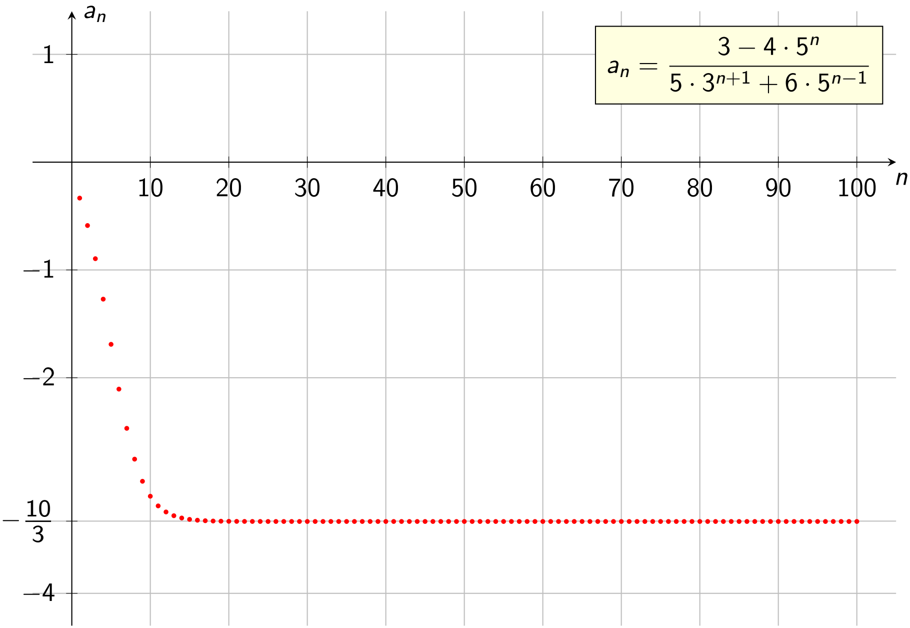
$$\frac{\infty}{\infty}$$

$$= \lim_{n\to+\infty} \frac{3-4\cdot 5^n}{15\cdot 3^n+\frac{6}{5}\cdot 5^n} = \lim_{n\to+\infty} \frac{\dfrac{3-4\cdot 5^n}{5^n}}{\dfrac{15\cdot 3^n+\frac{6}{5}\cdot 5^n}{5^n}} =$$

$$= \lim_{n\to+\infty} \frac{\dfrac{3}{5^n}-4}{15\cdot\dfrac{3^n}{5^n}+\dfrac{6}{5}} = \lim_{n\to+\infty} \frac{3\cdot\left(\dfrac{1}{5}\right)^n-4}{15\cdot\left(\dfrac{3}{5}\right)^n+\dfrac{6}{5}} =$$

$$= \frac{3\cdot 0-4}{15\cdot 0+\dfrac{6}{5}} = \frac{-4}{\dfrac{6}{5}} = \frac{-4\cdot 5}{6} = -\frac{10}{3}$$

$$\lim_{n\to+\infty} q^n = 0, \quad |q|<1$$


a_n
$a_n = \dfrac{3 - 4 \cdot 5^n}{5 \cdot 3^{n+1} + 6 \cdot 5^{n-1}}$
1
−1
−2
$-\frac{10}{3}$
−4
10
20
30
40
50
60
70
80
90
100
n

peti zadatak

Zadatak 5

Izračunajte sljedeće limese:

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

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

Rješenje

a)

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

Rješenje

a)
$$\lim_{n\to+\infty} \frac{n+2}{n} = 1$$

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

Rješenje

a) $$\lim_{n\to+\infty} \frac{n+2}{n} = 1 \qquad \lim_{n\to+\infty} 3n = +\infty$$

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

Rješenje

a) $\lim\limits_{n\to+\infty} \frac{n+2}{n} = 1$ $\lim\limits_{n\to+\infty} 3n = +\infty$ $\boxed{\lim\limits_{n\to+\infty} \left(1+\frac{1}{n}\right)^n = e}$

$\boxed{1^\infty}$ ⇝

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

Rješenje

a)

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

1^∞

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

Izrazu $\frac{n+2}{n}$ dodamo i oduzmemo 1

Rješenje

a) $\lim\limits_{n\to+\infty} \frac{n+2}{n} = 1$ $\quad \lim\limits_{n\to+\infty} 3n = +\infty$ $\quad \boxed{\lim\limits_{n\to+\infty} \left(1+\frac{1}{n}\right)^n = e}$

$\boxed{1^\infty}$

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

Rješenje

a) $\lim\limits_{n\to+\infty} \dfrac{n+2}{n} = 1$ $\qquad \lim\limits_{n\to+\infty} 3n = +\infty$ $\qquad \lim\limits_{n\to+\infty} \left(1+\dfrac{1}{n}\right)^n = e$

1^∞

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

Rješenje

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

1^∞

$$\lim_{n\to+\infty} \left(\frac{n+2}{n}\right)^{3n} = \lim_{n\to+\infty} \left(1 + \underbrace{\frac{n+2}{n} - 1}_{\text{svedemo na zajednički nazivnik}}\right)^{3n} =$$

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

Rješenje

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

1^∞

$$\lim_{n\to+\infty} \left(\frac{n+2}{n}\right)^{3n} = \lim_{n\to+\infty} \left(1+\underbrace{\frac{n+2}{n}-1}_{\text{svedemo na zajednički nazivnik}}\right)^{3n} =$$

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

Rješenje

a)

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

1^∞

$$\lim_{n\to+\infty} \left(\frac{n+2}{n}\right)^{3n} = \lim_{n\to+\infty} \left(1+\underbrace{\frac{n+2}{n}-1}_{\text{svedemo na zajednički nazivnik}}\right)^{3n} =$$

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

Rješenje

a) $$\lim_{n\to+\infty}\frac{n+2}{n}=1 \qquad \lim_{n\to+\infty}3n=+\infty \qquad \boxed{\lim_{n\to+\infty}\left(1+\frac{1}{n}\right)^{n}=e}$$

1^{∞}

$$\lim_{n\to+\infty}\left(\frac{n+2}{n}\right)^{3n}=\lim_{n\to+\infty}\left(1+\underbrace{\frac{n+2}{n}-1}_{\text{svedemo na zajednički nazivnik}}\right)^{3n}=$$

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

Rješenje

a) $\lim\limits_{n\to+\infty} \frac{n+2}{n} = 1$ $\quad \lim\limits_{n\to+\infty} 3n = +\infty$ $\quad \lim\limits_{n\to+\infty} \left(1+\frac{1}{n}\right)^n = e$

1^∞

$$\lim_{n\to+\infty} \left(\frac{n+2}{n}\right)^{3n} = \lim_{n\to+\infty} \left(1 + \underbrace{\frac{n+2}{n} - 1}_{\text{svedemo na zajednički nazivnik}}\right)^{3n} =$$

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

Rješenje

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

1^∞

$$\lim_{n\to+\infty} \left(\frac{n+2}{n}\right)^{3n} = \lim_{n\to+\infty} \left(1 + \underbrace{\frac{n+2}{n} - 1}_{\text{svedemo na zajednički nazivnik}}\right)^{3n} =$$

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

Rješenje

a) $\lim\limits_{n\to+\infty} \dfrac{n+2}{n} = 1$ $\quad \lim\limits_{n\to+\infty} 3n = +\infty$ $\quad \lim\limits_{n\to+\infty} \left(1+\dfrac{1}{n}\right)^n = e$

1^∞

$$\lim_{n\to+\infty} \left(\frac{n+2}{n}\right)^{3n} = \lim_{n\to+\infty} \Bigg(1 + \underbrace{\frac{n+2}{n} - 1}_{\substack{\text{svedemo na} \\ \text{zajednički nazivnik}}}\Bigg)^{3n} =$$

$$= \lim_{n\to+\infty} \left(1+\frac{2}{n}\right)^{3n} = \lim_{n\to+\infty} \left(1+\frac{2}{n}\right)^{\frac{n}{2}\cdot 3n\cdot\frac{2}{n}} = \lim_{n\to+\infty} \left[\left(1+\frac{2}{n}\right)^{\frac{n}{2}}\right]^{6}$$

$(a^n)^m = a^{nm}$

Rješenje

a) $\lim_{n\to+\infty} \frac{n+2}{n} = 1$ $\quad \lim_{n\to+\infty} 3n = +\infty$

$$\boxed{\lim_{n\to+\infty} \left(1+\frac{1}{n}\right)^n = e}$$

$\boxed{1^\infty}$

$$\lim_{n\to+\infty} \left(\frac{n+2}{n}\right)^{3n} = \lim_{n\to+\infty} \left(1+\underbrace{\frac{n+2}{n}-1}_{\text{svedemo na zajednički nazivnik}}\right)^{3n} =$$

$$= \lim_{n\to+\infty} \left(1+\frac{2}{n}\right)^{3n} = \lim_{n\to+\infty} \left(1+\frac{2}{n}\right)^{\frac{n}{2}\cdot 3n\cdot\frac{2}{n}} = \lim_{n\to+\infty} \left[\left(1+\frac{2}{n}\right)^{\frac{n}{2}}\right]^6 =$$

$$= \left[\lim_{n\to+\infty} \left(1+\frac{2}{n}\right)^{\frac{n}{2}}\right]^6$$

$$\boxed{(a^n)^m = a^{nm}}$$

Rješenje

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

1^∞

$$\lim_{n\to+\infty} \left(\frac{n+2}{n}\right)^{3n} = \lim_{n\to+\infty} \left(1 + \underbrace{\frac{n+2}{n} - 1}_{\text{svedemo na zajednički nazivnik}}\right)^{3n} =$$

- Kada je n jako veliki prirodni broj, tada je $\frac{2}{n}$ jako mali broj.

$$\infty \left[\left(1+\frac{2}{n}\right)^{\frac{n}{2}}\right]^6 =$$

$(a^n)^m = a^{nm}$

$$= \left[\lim_{n\to+\infty}\left(1+\frac{2}{n}\right)^{\frac{n}{2}}\right]^6$$

Rješenje

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

1^∞

$$\lim_{n\to+\infty}\left(\frac{n+2}{n}\right)^{3n} = \lim_{n\to+\infty}\left(1+\underbrace{\frac{n+2}{n}-1}_{\text{svedemo na zajednički nazivnik}}\right)^{3n} =$$

- Kada je n jako veliki prirodni broj, tada je $\frac{2}{n}$ jako mali broj.
- $\frac{n}{2}$ je recipročna vrijednost broja $\frac{2}{n}$.

$$\ldots\infty \left[\left(1+\frac{2}{n}\right)^{\frac{n}{2}}\right]^6 =$$

$(a^n)^m = a^{nm}$

$$= \left[\lim_{n\to+\infty}\left(1+\frac{2}{n}\right)^{\frac{n}{2}}\right]^6$$

Rješenje

a) $\lim_{n\to+\infty} \frac{n+2}{n} = 1$ $\qquad \lim_{n\to+\infty} 3n = +\infty$

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

1^∞

$$\lim_{n\to+\infty} \left(\frac{n+2}{n}\right)^{3n} = \lim_{n\to+\infty} \left(1+\underbrace{\frac{n+2}{n}-1}_{\text{svedemo na zajednički nazivnik}}\right)^{3n} =$$

- Kada je n jako veliki prirodni broj, tada je $\frac{2}{n}$ jako mali broj.
- $\frac{n}{2}$ je recipročna vrijednost broja $\frac{2}{n}$.

$$\infty \left[\left(1+\frac{2}{n}\right)^{\frac{n}{2}}\right]^6 =$$

$$(a^n)^m = a^{nm}$$

$$= \left[\lim_{n\to+\infty} \left(1+\frac{2}{n}\right)^{\frac{n}{2}}\right]^6$$

$(1 + \text{jako mali broj})^{\text{recipročna vrijednost tog jako malog broja}}$ teži broju e

Rješenje

a) $\lim\limits_{n\to+\infty} \frac{n+2}{n} = 1$ $\quad \lim\limits_{n\to+\infty} 3n = +\infty$ $\quad \lim\limits_{n\to+\infty} \left(1+\frac{1}{n}\right)^n = e$

1^∞

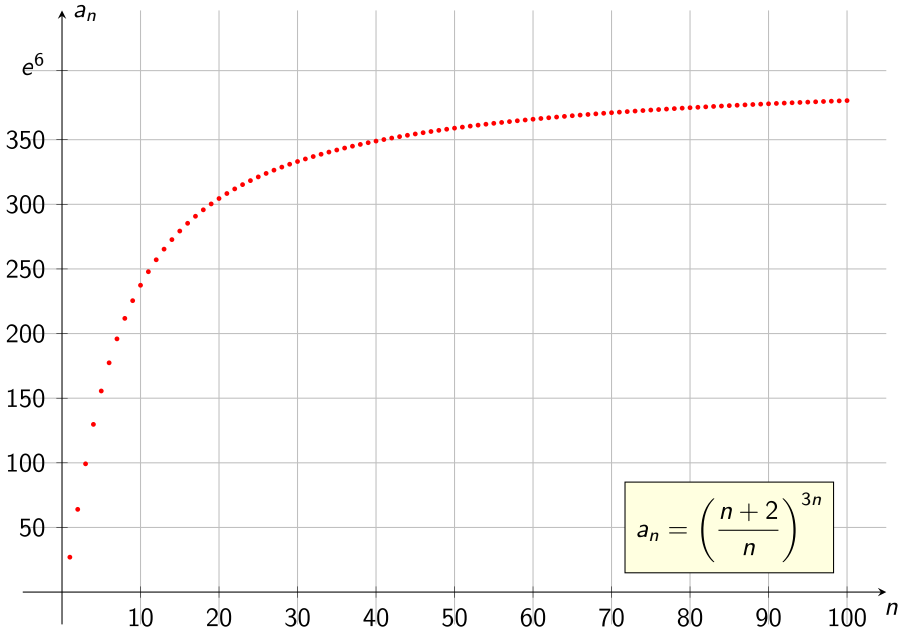
$$\lim_{n\to+\infty} \left(\frac{n+2}{n}\right)^{3n} = \lim_{n\to+\infty} \left(1 + \underbrace{\frac{n+2}{n} - 1}_{\text{svedemo na zajednički nazivnik}}\right)^{3n} =$$

$$= \lim_{n\to+\infty} \left(1+\frac{2}{n}\right)^{3n} = \lim_{n\to+\infty} \left(1+\frac{2}{n}\right)^{\frac{n}{2}\cdot 3n\cdot\frac{2}{n}} = \lim_{n\to+\infty} \left[\left(1+\frac{2}{n}\right)^{\frac{n}{2}}\right]^6 =$$

$$= \left[\lim_{n\to+\infty} \left(1+\frac{2}{n}\right)^{\frac{n}{2}}\right]^6 = e^6$$

$(a^n)^m = a^{nm}$

$(1 + \text{jako mali broj})^{\text{recipročna vrijednost tog jako malog broja}}$ teži broju e


a_n
e^6
350
300
250
200
150
100
50
10
20
30
40
50
60
70
80
90
100
n
$a_n = \left(\frac{n+2}{n}\right)^{3n}$

b)

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

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

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

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

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

b)

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

$\boxed{1^\infty}$ ⇝

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

b)

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

1^∞

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

Izrazu $\dfrac{n^2+2}{n^2+1}$ dodamo i oduzmemo 1

b) $\lim_{n\to+\infty} \frac{n^2+2}{n^2+1} = 1$ $\quad \lim_{n\to+\infty} \frac{1}{3}n^2 = +\infty$ $\quad \boxed{\lim_{n\to+\infty} \left(1+\frac{1}{n}\right)^n = e}$

$\boxed{1^\infty}$ ⇝

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

b) $$\lim_{n\to+\infty} \frac{n^2+2}{n^2+1} = 1 \qquad \lim_{n\to+\infty} \frac{1}{3}n^2 = +\infty \qquad \boxed{\lim_{n\to+\infty} \left(1+\frac{1}{n}\right)^n = e}$$

$\boxed{1^\infty}$ ⇝

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

b) $$\lim_{n\to+\infty} \frac{n^2+2}{n^2+1} = 1 \qquad \lim_{n\to+\infty} \frac{1}{3}n^2 = +\infty \qquad \boxed{\lim_{n\to+\infty} \left(1+\frac{1}{n}\right)^n = e}$$

$\boxed{1^\infty}$

$$\lim_{n\to+\infty} \left(\frac{n^2+2}{n^2+1}\right)^{\frac{1}{3}n^2} = \lim_{n\to+\infty} \left(1 + \underbrace{\frac{n^2+2}{n^2+1} - 1}_{\text{svedemo na zajednički nazivnik}}\right)^{\frac{1}{3}n^2} =$$

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

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

1^∞

$$\lim_{n\to+\infty} \left(\frac{n^2+2}{n^2+1}\right)^{\frac{1}{3}n^2} = \lim_{n\to+\infty} \left(1+\underbrace{\frac{n^2+2}{n^2+1}-1}_{\text{svedemo na zajednički nazivnik}}\right)^{\frac{1}{3}n^2} =$$

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

b) $$\lim_{n\to+\infty}\frac{n^2+2}{n^2+1}=1 \qquad \lim_{n\to+\infty}\frac{1}{3}n^2=+\infty \qquad \boxed{\lim_{n\to+\infty}\left(1+\frac{1}{n}\right)^n=e}$$

1^∞

$$\lim_{n\to+\infty}\left(\frac{n^2+2}{n^2+1}\right)^{\frac{1}{3}n^2}=\lim_{n\to+\infty}\left(1+\underbrace{\frac{n^2+2}{n^2+1}-1}_{\text{svedemo na zajednički nazivnik}}\right)^{\frac{1}{3}n^2}=$$

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

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

1^∞

$$\lim_{n\to+\infty}\left(\frac{n^2+2}{n^2+1}\right)^{\frac{1}{3}n^2}=\lim_{n\to+\infty}\left(1+\underbrace{\frac{n^2+2}{n^2+1}-1}_{\text{svedemo na zajednički nazivnik}}\right)^{\frac{1}{3}n^2}=$$

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

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

1^∞

$$\lim_{n\to+\infty} \left(\frac{n^2+2}{n^2+1}\right)^{\frac{1}{3}n^2} = \lim_{n\to+\infty} \left(1+\underbrace{\frac{n^2+2}{n^2+1}-1}_{\text{svedemo na zajednički nazivnik}}\right)^{\frac{1}{3}n^2} =$$

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

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

1^∞

$$\lim_{n\to+\infty} \left(\frac{n^2+2}{n^2+1}\right)^{\frac{1}{3}n^2} = \lim_{n\to+\infty} \left(1 + \underbrace{\frac{n^2+2}{n^2+1} - 1}_{\text{svedemo na zajednički nazivnik}}\right)^{\frac{1}{3}n^2} =$$

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

b) $\lim\limits_{n\to+\infty} \dfrac{n^2+2}{n^2+1} = 1$ $\qquad$ $\lim\limits_{n\to+\infty} \dfrac{1}{3}n^2 = +\infty$ $\qquad$ $\boxed{\lim\limits_{n\to+\infty} \left(1+\dfrac{1}{n}\right)^n = e}$

$\boxed{1^\infty}$

$$\lim_{n\to+\infty}\left(\frac{n^2+2}{n^2+1}\right)^{\frac{1}{3}n^2} = \lim_{n\to+\infty}\left(1+\underbrace{\frac{n^2+2}{n^2+1}-1}_{\text{svedemo na zajednički nazivnik}}\right)^{\frac{1}{3}n^2} =$$

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

$\boxed{(a^n)^m = a^{nm}}$

b) $$\lim_{n\to+\infty} \frac{n^2+2}{n^2+1} = 1 \qquad \lim_{n\to+\infty} \frac{1}{3}n^2 = +\infty \qquad \boxed{\lim_{n\to+\infty} \left(1+\frac{1}{n}\right)^n = e}$$

$\boxed{1^\infty}$

$$\lim_{n\to+\infty} \left(\frac{n^2+2}{n^2+1}\right)^{\frac{1}{3}n^2} = \lim_{n\to+\infty} \left(1 + \underbrace{\frac{n^2+2}{n^2+1} - 1}_{\text{svedemo na zajednički nazivnik}}\right)^{\frac{1}{3}n^2} =$$

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

$$\boxed{(a^n)^m = a^{nm}}$$

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

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

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

1^∞

$$\lim_{n\to+\infty} \left(\frac{n^2+2}{n^2+1}\right)^{\frac{1}{3}n^2} = \lim_{n\to+\infty} \left(1+\underbrace{\frac{n^2+2}{n^2+1}-1}_{\text{svedemo na zajednički nazivnik}}\right)^{\frac{1}{3}n^2} =$$

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

$$(a^n)^m = a^{nm}$$

$$= \left[\lim_{n\to+\infty} \left(1+\frac{1}{n^2+1}\right)^{n^2+1}\right]^{\lim\limits_{n\to+\infty} \frac{n^2}{3n^2+3}}$$

b)

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

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

1^∞

$$\lim_{n\to+\infty} \left(\frac{n^2+2}{n^2+1}\right)^{\frac{1}{3}n^2} = \lim_{n\to+\infty} \left(1+\underbrace{\frac{n^2+2}{n^2+1}-1}_{\text{svedemo na zajednički nazivnik}}\right)^{\frac{1}{3}n^2} =$$

- Kada je n jako veliki prirodni broj, tada je $\frac{1}{n^2+1}$ jako mali broj.

$+1)\cdot\frac{1}{3}n^2\cdot\frac{1}{n^2+1}$

$=$

$$(a^n)^m = a^{nm}$$

$$= \left[\lim_{n\to+\infty}\left(1+\frac{1}{n^2+1}\right)^{n^2+1}\right]^{\lim\limits_{n\to+\infty}\frac{n^2}{3n^2+3}}$$

b) $\lim\limits_{n\to+\infty} \dfrac{n^2+2}{n^2+1} = 1$ $\lim\limits_{n\to+\infty} \dfrac{1}{3}n^2 = +\infty$

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

1^∞

$$\lim_{n\to+\infty}\left(\frac{n^2+2}{n^2+1}\right)^{\frac{1}{3}n^2} = \lim_{n\to+\infty}\left(1+\underbrace{\frac{n^2+2}{n^2+1}-1}_{\text{svedemo na zajednički nazivnik}}\right)^{\frac{1}{3}n^2} =$$

- Kada je n jako veliki prirodni broj, tada je $\frac{1}{n^2+1}$ jako mali broj.
- n^2+1 je recipročna vrijednost broja $\frac{1}{n^2+1}$.

$$+1)\cdot\frac{1}{3}n^2\cdot\frac{1}{n^2+1}$$

$=$

$$(a^n)^m = a^{nm}$$

$$= \left[\lim_{n\to+\infty}\left(1+\frac{1}{n^2+1}\right)^{n^2+1}\right]^{\lim\limits_{n\to+\infty}\frac{n^2}{3n^2+3}}$$

b) $\lim\limits_{n\to+\infty} \dfrac{n^2+2}{n^2+1} = 1$ $\qquad \lim\limits_{n\to+\infty} \dfrac{1}{3}n^2 = +\infty$

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

1^∞

$$\lim_{n\to+\infty}\left(\frac{n^2+2}{n^2+1}\right)^{\frac{1}{3}n^2} = \lim_{n\to+\infty}\left(1+\underbrace{\frac{n^2+2}{n^2+1}-1}_{\text{svedemo na zajednički nazivnik}}\right)^{\frac{1}{3}n^2} =$$

- Kada je n jako veliki prirodni broj, tada je $\frac{1}{n^2+1}$ jako mali broj.
- n^2+1 je recipročna vrijednost broja $\frac{1}{n^2+1}$.

$+1)\cdot\frac{1}{3}n^2\cdot\frac{1}{n^2+1}$

$=$

$$(a^n)^m = a^{nm}$$

$$= \left[\lim_{n\to+\infty}\left(1+\frac{1}{n^2+1}\right)^{n^2+1}\right]^{\lim\limits_{n\to+\infty}\frac{n^2}{3n^2+3}}$$

$(1+\text{jako mali broj})^{\text{recipročna vrijednost tog jako malog broja}}$ teži broju e

b)
$$\lim_{n\to+\infty}\frac{n^2+2}{n^2+1}=1 \qquad \lim_{n\to+\infty}\frac{1}{3}n^2=+\infty \qquad \boxed{\lim_{n\to+\infty}\left(1+\frac{1}{n}\right)^n=e}$$

1^∞

$$\lim_{n\to+\infty}\left(\frac{n^2+2}{n^2+1}\right)^{\frac{1}{3}n^2}=\lim_{n\to+\infty}\left(1+\underbrace{\frac{n^2+2}{n^2+1}-1}_{\text{svedemo na zajednički nazivnik}}\right)^{\frac{1}{3}n^2}=$$

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

$$\boxed{(a^n)^m=a^{nm}}$$

$$=\left[\lim_{n\to+\infty}\left(1+\frac{1}{n^2+1}\right)^{n^2+1}\right]^{\lim\limits_{n\to+\infty}\frac{n^2}{3n^2+3}}=e^{\frac{1}{3}}$$

(1 + jako mali broj)$^{\text{recipročna vrijednost tog jako malog broja}}$ teži broju e

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

1^∞

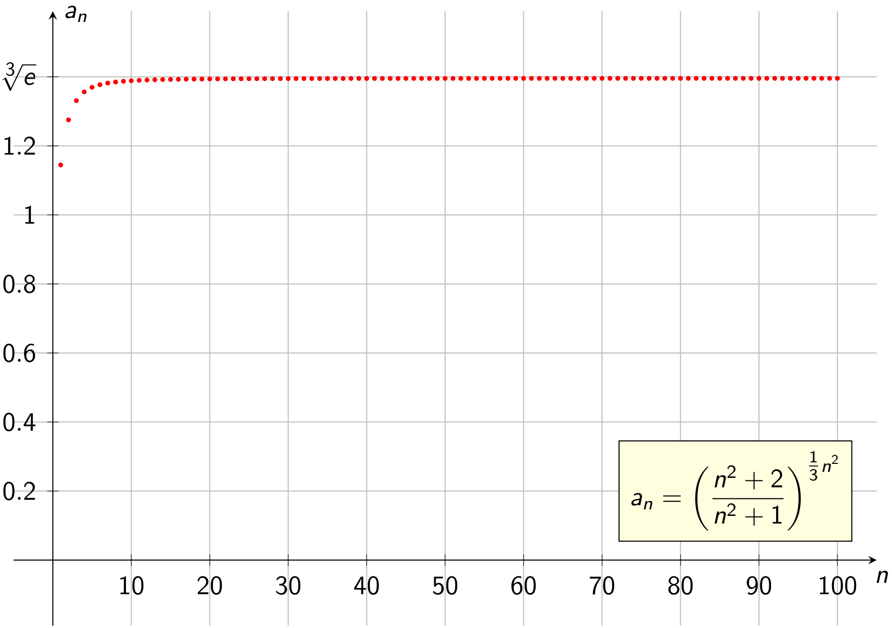
$$\lim_{n\to+\infty} \left(\frac{n^2+2}{n^2+1}\right)^{\frac{1}{3}n^2} = \lim_{n\to+\infty} \left(1+\underbrace{\frac{n^2+2}{n^2+1}-1}_{\text{svedemo na zajednički nazivnik}}\right)^{\frac{1}{3}n^2} =$$

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

$(a^n)^m = a^{nm}$

$$= \left[\lim_{n\to+\infty} \left(1+\frac{1}{n^2+1}\right)^{n^2+1}\right]^{\lim\limits_{n\to+\infty} \frac{n^2}{3n^2+3}} = e^{\frac{1}{3}} = \sqrt[3]{e}$$

$(1+\text{jako mali broj})^{\text{recipročna vrijednost tog jako malog broja}}$ teži broju e


a_n
$\sqrt[3]{e}$
1.2
1
0.8
0.6
0.4
0.2
10
20
30
40
50
60
70
80
90
100
n
$a_n = \left(\frac{n^2+2}{n^2+1}\right)^{\frac{1}{3}n^2}$

šesti zadatak

Zadatak 6

Zapišite periodički decimalni broj $0.\dot{4}\dot{3}$ *u obliku razlomka.*

Zadatak 6

Zapišite periodički decimalni broj $0.\dot{4}\dot{3}$ *u obliku razlomka.*

Rješenje

$0.\dot{4}\dot{3} =$

Zadatak 6

Zapišite periodički decimalni broj $0.\dot{4}\dot{3}$ *u obliku razlomka.*

Rješenje

$$0.\dot{4}\dot{3} = 0.43434343\cdots$$

Zadatak 6

Zapišite periodički decimalni broj $0.\dot{4}\dot{3}$ *u obliku razlomka.*

Rješenje

$$0.\dot{4}\dot{3} = 0.43434343\cdots =$$

Zadatak 6

Zapišite periodički decimalni broj $0.\dot{4}\dot{3}$ *u obliku razlomka.*

Rješenje

$$0.\dot{4}\dot{3} = 0.43434343\cdots = 0.43$$

Zadatak 6

Zapišite periodički decimalni broj $0.\dot{4}\dot{3}$ *u obliku razlomka.*

Rješenje

$$0.\dot{4}\dot{3} = 0.43434343\cdots = 0.43 + 0.0043$$

Zadatak 6

Zapišite periodički decimalni broj $0.\dot{4}\dot{3}$ *u obliku razlomka.*

Rješenje

$$0.\dot{4}\dot{3} = 0.43434343\cdots = 0.43 + 0.0043 + 0.000043$$

Zadatak 6

Zapišite periodički decimalni broj $0.\dot{4}\dot{3}$ *u obliku razlomka.*

Rješenje

$$0.\dot{4}\dot{3} = 0.43434343\cdots = 0.43 + 0.0043 + 0.000043 + \cdots$$

Zadatak 6

Zapišite periodički decimalni broj $0.\dot{4}\dot{3}$ *u obliku razlomka.*

Rješenje

$$0.\dot{4}\dot{3} = 0.43434343\cdots = 0.43 + 0.0043 + 0.000043 + \cdots =$$

Zadatak 6

Zapišite periodički decimalni broj $0.\dot{4}\dot{3}$ *u obliku razlomka.*

Rješenje

$$0.\dot{4}\dot{3} = 0.43434343\cdots = 0.43 + 0.0043 + 0.000043 + \cdots =$$

$$= \frac{43}{10^2}$$

Zadatak 6

Zapišite periodički decimalni broj $0.\dot{4}\dot{3}$ *u obliku razlomka.*

Rješenje

$$0.\dot{4}\dot{3} = 0.43434343\cdots = 0.43 + 0.0043 + 0.000043 + \cdots =$$

$$= \frac{43}{10^2} + \frac{43}{10^4}$$

Zadatak 6

Zapišite periodički decimalni broj $0.\dot{4}\dot{3}$ *u obliku razlomka.*

Rješenje

$$0.\dot{4}\dot{3} = 0.43434343\cdots = 0.43 + 0.0043 + 0.000043 + \cdots =$$

$$= \frac{43}{10^2} + \frac{43}{10^4} + \frac{43}{10^6}$$

Zadatak 6

Zapišite periodički decimalni broj $0.\dot{4}\dot{3}$ *u obliku razlomka.*

Rješenje

$$0.\dot{4}\dot{3} = 0.43434343\cdots = 0.43 + 0.0043 + 0.000043 + \cdots =$$

$$= \frac{43}{10^2} + \frac{43}{10^4} + \frac{43}{10^6} + \cdots$$

Zadatak 6

Zapišite periodički decimalni broj $0.\dot{4}\dot{3}$ *u obliku razlomka.*

Rješenje

$$0.\dot{4}\dot{3} = 0.43434343\cdots = 0.43 + 0.0043 + 0.000043 + \cdots =$$

$$= \frac{43}{10^2} + \frac{43}{10^4} + \frac{43}{10^6} + \cdots =$$

Zadatak 6

Zapišite periodički decimalni broj $0.\dot{4}\dot{3}$ *u obliku razlomka.*

Rješenje

$$0.\dot{4}\dot{3} = 0.43434343\cdots = 0.43 + 0.0043 + 0.000043 + \cdots =$$

$$= \frac{43}{10^2} + \frac{43}{10^4} + \frac{43}{10^6} + \cdots = \frac{43}{100} \cdot \left(\qquad \qquad \qquad \right)$$

Zadatak 6

Zapišite periodički decimalni broj $0.\dot{4}\dot{3}$ *u obliku razlomka.*

Rješenje

$$0.\dot{4}\dot{3} = 0.43434343\cdots = 0.43 + 0.0043 + 0.000043 + \cdots =$$

$$= \frac{43}{10^2} + \frac{43}{10^4} + \frac{43}{10^6} + \cdots = \frac{43}{100} \cdot \Bigg(1 \qquad\qquad\qquad\qquad \Bigg)$$

Zadatak 6

Zapišite periodički decimalni broj $0.\dot{4}\dot{3}$ *u obliku razlomka.*

Rješenje

$$0.\dot{4}\dot{3} = 0.43434343\cdots = 0.43 + 0.0043 + 0.000043 + \cdots =$$

$$= \frac{43}{10^2} + \frac{43}{10^4} + \frac{43}{10^6} + \cdots = \frac{43}{100} \cdot \left(1 + \frac{1}{100} \qquad\qquad\qquad \right)$$

Zadatak 6

Zapišite periodički decimalni broj $0.\dot{4}\dot{3}$ *u obliku razlomka.*

Rješenje

$$0.\dot{4}\dot{3} = 0.43434343\cdots = 0.43 + 0.0043 + 0.000043 + \cdots =$$

$$= \frac{43}{10^2} + \frac{43}{10^4} + \frac{43}{10^6} + \cdots = \frac{43}{100} \cdot \left(1 + \frac{1}{100} + \frac{1}{100^2} \qquad \right)$$

Zadatak 6

Zapišite periodički decimalni broj $0.\dot{4}\dot{3}$ *u obliku razlomka.*

Rješenje

$$0.\dot{4}\dot{3} = 0.43434343\cdots = 0.43 + 0.0043 + 0.000043 + \cdots =$$

$$= \frac{43}{10^2} + \frac{43}{10^4} + \frac{43}{10^6} + \cdots = \frac{43}{100} \cdot \left(1 + \frac{1}{100} + \frac{1}{100^2} + \cdots\right)$$

Zadatak 6

Zapišite periodički decimalni broj $0.\dot{4}\dot{3}$ *u obliku razlomka.*

Rješenje

$$0.\dot{4}\dot{3} = 0.43434343\cdots = 0.43 + 0.0043 + 0.000043 + \cdots =$$

$$= \frac{43}{10^2} + \frac{43}{10^4} + \frac{43}{10^6} + \cdots = \frac{43}{100} \cdot \left(1 + \frac{1}{100} + \frac{1}{100^2} + \cdots\right) =$$

Zadatak 6

Zapišite periodički decimalni broj $0.\dot{4}\dot{3}$ *u obliku razlomka.*

Rješenje

$$0.\dot{4}\dot{3} = 0.43434343\cdots = 0.43 + 0.0043 + 0.000043 + \cdots =$$

$$= \frac{43}{10^2} + \frac{43}{10^4} + \frac{43}{10^6} + \cdots = \frac{43}{100} \cdot \left(1 + \frac{1}{100} + \frac{1}{100^2} + \cdots\right) =$$

$$= \frac{43}{100} \cdot$$

Zadatak 6

Zapišite periodički decimalni broj $0.\dot{4}\dot{3}$ *u obliku razlomka.*

Rješenje

$$0.\dot{4}\dot{3} = 0.43434343\cdots = 0.43 + 0.0043 + 0.000043 + \cdots =$$

$$= \frac{43}{10^2} + \frac{43}{10^4} + \frac{43}{10^6} + \cdots = \frac{43}{100} \cdot \underbrace{\left(1 + \frac{1}{100} + \frac{1}{100^2} + \cdots\right)}_{\text{suma geometrijskog reda}} =$$

$$= \frac{43}{100} \cdot$$

Zadatak 6

Zapišite periodički decimalni broj $0.\dot{4}\dot{3}$ *u obliku razlomka.*

Rješenje

$$0.\dot{4}\dot{3} = 0.43434343\cdots = 0.43 + 0.0043 + 0.000043 + \cdots =$$

$$= \frac{43}{10^2} + \frac{43}{10^4} + \frac{43}{10^6} + \cdots = \frac{43}{100} \cdot \underbrace{\left(1 + \frac{1}{100} + \frac{1}{100^2} + \cdots\right)}_{\text{suma geometrijskog reda}} =$$

$$= \frac{43}{100} \cdot$$

$$a_1 + a_1 q + a_1 q^2 + a_1 q^3 + \cdots = \frac{a_1}{1-q}, \quad |q| < 1$$

Zadatak 6

Zapišite periodički decimalni broj $0.\dot{4}\dot{3}$ u obliku razlomka.

Rješenje

$$0.\dot{4}\dot{3} = 0.43434343\cdots = 0.43 + 0.0043 + 0.000043 + \cdots =$$

$$= \frac{43}{10^2} + \frac{43}{10^4} + \frac{43}{10^6} + \cdots = \frac{43}{100} \cdot \underbrace{\left(1 + \frac{1}{100} + \frac{1}{100^2} + \cdots\right)}_{\text{suma geometrijskog reda}} =$$

$$a_1 = 1$$

$$= \frac{43}{100} \cdot$$

$$a_1 + a_1 q + a_1 q^2 + a_1 q^3 + \cdots = \frac{a_1}{1-q}, \quad |q| < 1$$

Zadatak 6

Zapišite periodički decimalni broj $0.\dot{4}\dot{3}$ *u obliku razlomka.*

Rješenje

$$0.\dot{4}\dot{3} = 0.43434343\cdots = 0.43 + 0.0043 + 0.000043 + \cdots =$$

$$= \frac{43}{10^2} + \frac{43}{10^4} + \frac{43}{10^6} + \cdots = \frac{43}{100} \cdot \underbrace{\left(1 + \frac{1}{100} + \frac{1}{100^2} + \cdots\right)}_{\text{suma geometrijskog reda}} =$$

$$a_1 = 1,\ q = \frac{1}{100}$$

$$= \frac{43}{100}\,.$$

$$a_1 + a_1 q + a_1 q^2 + a_1 q^3 + \cdots = \frac{a_1}{1-q}, \quad |q| < 1$$

Zadatak 6

Zapišite periodički decimalni broj $0.\dot{4}\dot{3}$ *u obliku razlomka.*

Rješenje

$$0.\dot{4}\dot{3} = 0.43434343\cdots = 0.43 + 0.0043 + 0.000043 + \cdots =$$

$$= \frac{43}{10^2} + \frac{43}{10^4} + \frac{43}{10^6} + \cdots = \frac{43}{100} \cdot \underbrace{\left(1 + \frac{1}{100} + \frac{1}{100^2} + \cdots\right)}_{\text{suma geometrijskog reda}} =$$

$$a_1 = 1, \;\; q = \frac{1}{100}$$

$$= \frac{43}{100} \cdot \underline{\qquad\qquad}$$

$$a_1 + a_1 q + a_1 q^2 + a_1 q^3 + \cdots = \frac{a_1}{1-q}, \quad |q| < 1$$

Zadatak 6

Zapišite periodički decimalni broj $0.\dot{4}\dot{3}$ *u obliku razlomka.*

Rješenje

$$0.\dot{4}\dot{3} = 0.43434343\cdots = 0.43 + 0.0043 + 0.000043 + \cdots =$$

$$= \frac{43}{10^2} + \frac{43}{10^4} + \frac{43}{10^6} + \cdots = \frac{43}{100} \cdot \underbrace{\left(1 + \frac{1}{100} + \frac{1}{100^2} + \cdots\right)}_{\text{suma geometrijskog reda}} =$$

$$a_1 = 1,\ q = \frac{1}{100}$$

$$= \frac{43}{100} \cdot \frac{1}{}$$

$$a_1 + a_1 q + a_1 q^2 + a_1 q^3 + \cdots = \frac{a_1}{1-q}, \quad |q| < 1$$

Zadatak 6

Zapišite periodički decimalni broj $0.\dot{4}\dot{3}$ *u obliku razlomka.*

Rješenje

$$0.\dot{4}\dot{3} = 0.43434343\cdots = 0.43 + 0.0043 + 0.000043 + \cdots =$$

$$= \frac{43}{10^2} + \frac{43}{10^4} + \frac{43}{10^6} + \cdots = \frac{43}{100} \cdot \underbrace{\left(1 + \frac{1}{100} + \frac{1}{100^2} + \cdots\right)}_{\text{suma geometrijskog reda}} =$$

$$a_1 = 1, \; q = \frac{1}{100}$$

$$= \frac{43}{100} \cdot \frac{1}{1 - \frac{1}{100}}$$

$$a_1 + a_1 q + a_1 q^2 + a_1 q^3 + \cdots = \frac{a_1}{1-q}, \quad |q| < 1$$

Zadatak 6

Zapišite periodički decimalni broj $0.\dot{4}\dot{3}$ *u obliku razlomka.*

Rješenje

$$0.\dot{4}\dot{3} = 0.43434343\cdots = 0.43 + 0.0043 + 0.000043 + \cdots =$$

$$= \frac{43}{10^2} + \frac{43}{10^4} + \frac{43}{10^6} + \cdots = \frac{43}{100} \cdot \underbrace{\left(1 + \frac{1}{100} + \frac{1}{100^2} + \cdots\right)}_{\text{suma geometrijskog reda}} =$$

$$= \frac{43}{100} \cdot \frac{1}{1 - \frac{1}{100}} = \frac{43}{99}.$$

suma geometrijskog reda

$a_1 = 1, \ q = \frac{1}{100}$

$$a_1 + a_1 q + a_1 q^2 + a_1 q^3 + \cdots = \frac{a_1}{1-q}, \quad |q| < 1$$

Zadatak 6

Zapišite periodički decimalni broj $0.\dot{4}\dot{3}$ *u obliku razlomka.*

Rješenje

$$0.\dot{4}\dot{3} = 0.43434343\cdots = 0.43 + 0.0043 + 0.000043 + \cdots =$$

$$= \frac{43}{10^2} + \frac{43}{10^4} + \frac{43}{10^6} + \cdots = \frac{43}{100} \cdot \underbrace{\left(1 + \frac{1}{100} + \frac{1}{100^2} + \cdots\right)}_{\text{suma geometrijskog reda}} =$$

$$= \frac{43}{100} \cdot \frac{1}{1 - \frac{1}{100}} = \frac{43}{100} \cdot \frac{1}{\frac{99}{100}}$$

$a_1 = 1,\ q = \frac{1}{100}$

$$a_1 + a_1 q + a_1 q^2 + a_1 q^3 + \cdots = \frac{a_1}{1-q}, \quad |q| < 1$$

Zadatak 6

Zapišite periodički decimalni broj $0.\dot{4}\dot{3}$ *u obliku razlomka.*

Rješenje

$$0.\dot{4}\dot{3} = 0.43434343\cdots = 0.43 + 0.0043 + 0.000043 + \cdots =$$

$$= \frac{43}{10^2} + \frac{43}{10^4} + \frac{43}{10^6} + \cdots = \frac{43}{100} \cdot \underbrace{\left(1 + \frac{1}{100} + \frac{1}{100^2} + \cdots\right)}_{\text{suma geometrijskog reda}} =$$

$$a_1 = 1, \ q = \frac{1}{100}$$

$$= \frac{43}{100} \cdot \frac{1}{1 - \frac{1}{100}} = \frac{43}{100} \cdot \frac{1}{\frac{99}{100}} =$$

$$= \frac{43}{100} \cdot \frac{100}{99}$$

$$a_1 + a_1 q + a_1 q^2 + a_1 q^3 + \cdots = \frac{a_1}{1-q}, \quad |q| < 1$$

Zadatak 6

Zapišite periodički decimalni broj $0.\dot{4}\dot{3}$ *u obliku razlomka.*

Rješenje

$$0.\dot{4}\dot{3} = 0.43434343\cdots = 0.43 + 0.0043 + 0.000043 + \cdots =$$

$$= \frac{43}{10^2} + \frac{43}{10^4} + \frac{43}{10^6} + \cdots = \frac{43}{100} \cdot \underbrace{\left(1 + \frac{1}{100} + \frac{1}{100^2} + \cdots\right)}_{\text{suma geometrijskog reda}} =$$

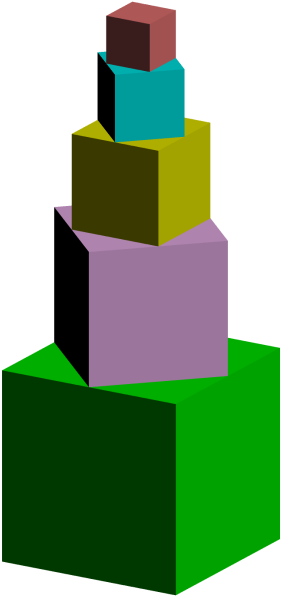
$$a_1 = 1, \; q = \frac{1}{100}$$

$$= \frac{43}{100} \cdot \frac{1}{1 - \frac{1}{100}} = \frac{43}{100} \cdot \frac{1}{\frac{99}{100}} =$$

$$= \frac{43}{100} \cdot \frac{100}{99} = \frac{43}{99}$$

$$a_1 + a_1 q + a_1 q^2 + a_1 q^3 + \cdots = \frac{a_1}{1-q}, \quad |q| < 1$$

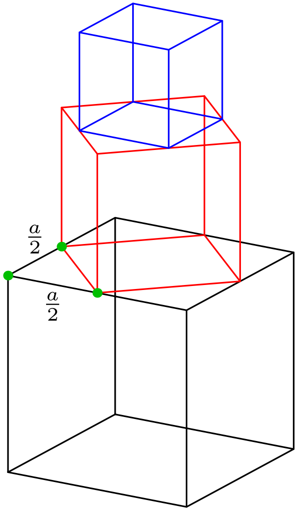
sedmi zadatak

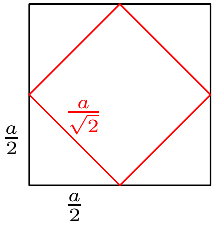


Zadatak 7

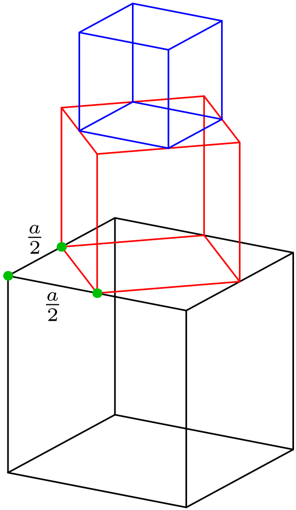
Na kocku duljine brida a postavi se nova kocka kojoj vrhovi donje osnovice leže u polovištima bridova gornje osnovice prve kocke. Na isti način se na drugu kocku postavi treća kocka, na treću kocku četvrta kocka itd. Odredite zbroj volumena svih ovih kocaka.

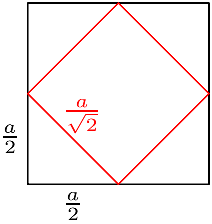
Rješenje





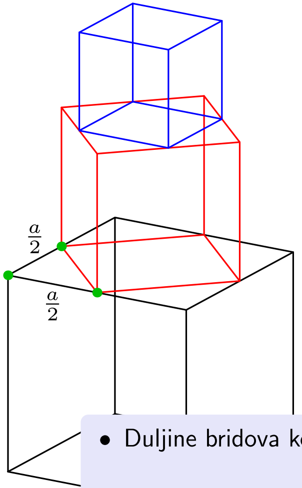
Rješenje

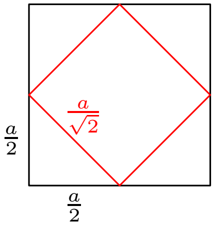




✏ Duljine bridova kocki su redom

Rješenje

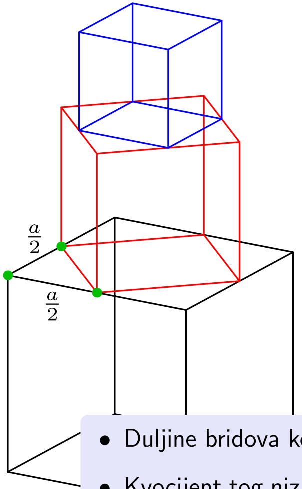


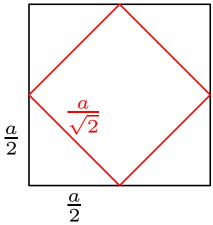


✏ Duljine bridova kocki su redom

- Duljine bridova kocki čine geometrijski niz (b_n).

Rješenje

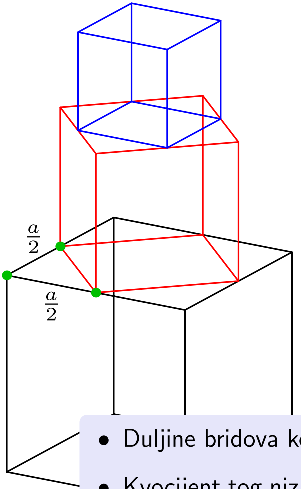


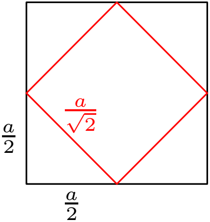


✏ Duljine bridova kocki su redom

- Duljine bridova kocki čine geometrijski niz (b_n).
- Kvocijent tog niza jednak je $q = \frac{1}{\sqrt{2}}$, a prvi član jednak je $b_1 = a$.

Rješenje

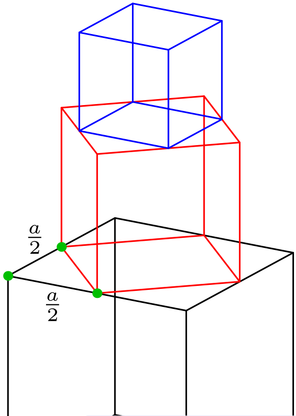


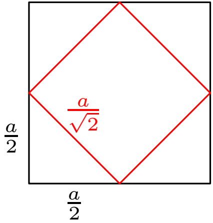


✏ Duljine bridova kocki su redom

- Duljine bridova kocki čine geometrijski niz (b_n).
- Kvocijent tog niza jednak je $q = \frac{1}{\sqrt{2}}$, a prvi član jednak je $b_1 = a$.
- Dakle, $b_n = a \cdot \left(\frac{1}{\sqrt{2}}\right)^{n-1}$.

Rješenje



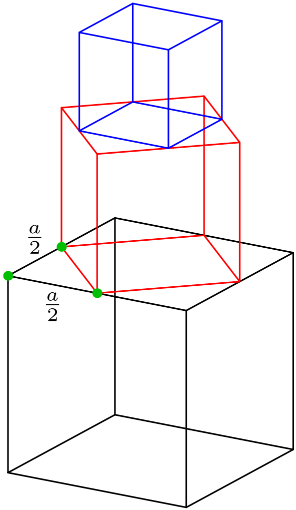


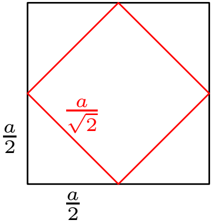
✏ Duljine bridova kocki su redom

$$a, \ \frac{a}{\sqrt{2}}, \ \frac{a}{2}, \ \frac{a}{2\sqrt{2}}, \ \frac{a}{4}, \ldots$$

- Duljine bridova kocki čine geometrijski niz (b_n).
- Kvocijent tog niza jednak je $q = \frac{1}{\sqrt{2}}$, a prvi član jednak je $b_1 = a$.
- Dakle, $b_n = a \cdot \left(\frac{1}{\sqrt{2}}\right)^{n-1}$.

Rješenje



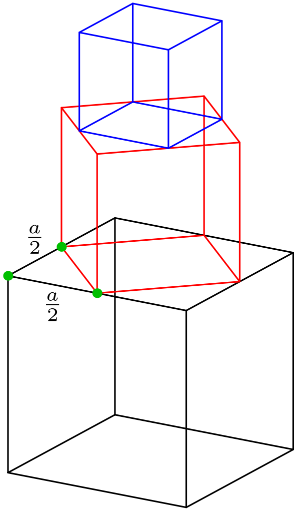


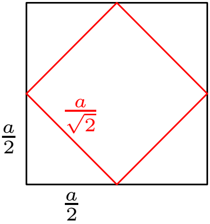
✏ Duljine bridova kocki su redom

$$a, \ \frac{a}{\sqrt{2}}, \ \frac{a}{2}, \ \frac{a}{2\sqrt{2}}, \ \frac{a}{4}, \ldots$$

✏ Volumeni kocki su redom

Rješenje





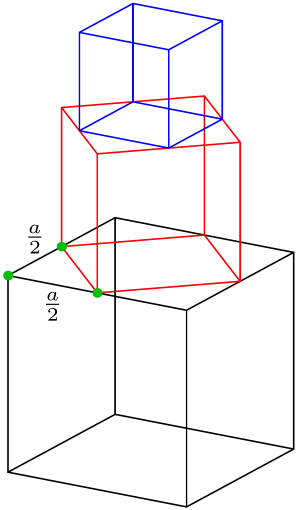
✏ Duljine bridova kocki su redom

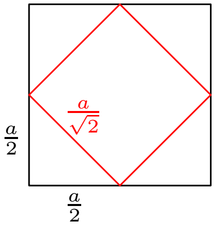
$$a,\ \frac{a}{\sqrt{2}},\ \frac{a}{2},\ \frac{a}{2\sqrt{2}},\ \frac{a}{4},\ \ldots$$

✏ Volumeni kocki su redom

Volumen kocke duljine brida a jednak je $V = a^3$.

Rješenje





✏ Duljine bridova kocki su redom

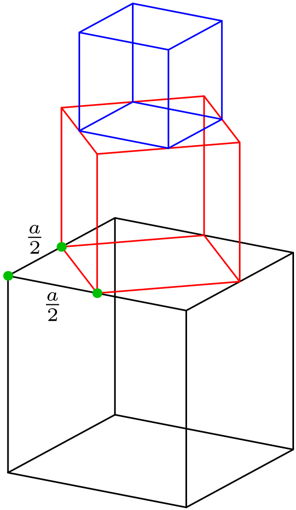
$$a,\ \frac{a}{\sqrt{2}},\ \frac{a}{2},\ \frac{a}{2\sqrt{2}},\ \frac{a}{4},\ \ldots$$

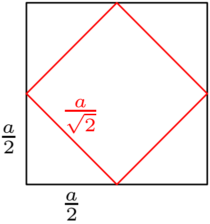
✏ Volumeni kocki su redom

$$a^3,\ \frac{a^3}{2\sqrt{2}},\ \frac{a^3}{8},\ \frac{a^3}{16\sqrt{2}},\ \frac{a^3}{64},\ \ldots$$

Volumen kocke duljine brida a jednak je $V = a^3$.

Rješenje





✏ Duljine bridova kocki su redom

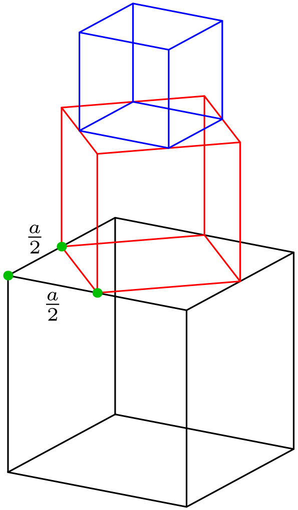
$$a,\ \frac{a}{\sqrt{2}},\ \frac{a}{2},\ \frac{a}{2\sqrt{2}},\ \frac{a}{4},\ldots$$

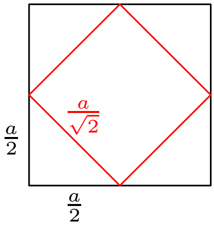
✏ Volumeni kocki su redom

$$a^3,\ \frac{a^3}{2\sqrt{2}},\ \frac{a^3}{8},\ \frac{a^3}{16\sqrt{2}},\ \frac{a^3}{64},\ldots$$

$$a^3+\frac{a^3}{2\sqrt{2}}+\frac{a^3}{8}+\frac{a^3}{16\sqrt{2}}+\frac{a^3}{64}+\cdots=$$

Rješenje





$$\sum_{n=1}^{\infty} a_1 q^{n-1} = \frac{a_1}{1-q}$$

✏ Duljine bridova kocki su redom

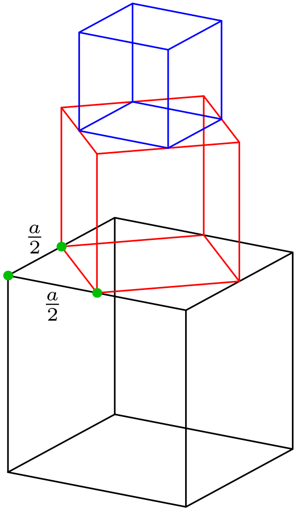
$$a,\ \frac{a}{\sqrt{2}},\ \frac{a}{2},\ \frac{a}{2\sqrt{2}},\ \frac{a}{4},\ldots$$

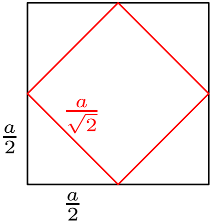
✏ Volumeni kocki su redom

$$a^3,\ \frac{a^3}{2\sqrt{2}},\ \frac{a^3}{8},\ \frac{a^3}{16\sqrt{2}},\ \frac{a^3}{64},\ldots$$

$$a^3 + \frac{a^3}{2\sqrt{2}} + \frac{a^3}{8} + \frac{a^3}{16\sqrt{2}} + \frac{a^3}{64} + \cdots =$$

Rješenje





$$\sum_{n=1}^{\infty} a_1 q^{n-1} = \frac{a_1}{1-q}$$

$$a_1 = a^3, \ q = \frac{1}{2\sqrt{2}}$$

✏ Duljine bridova kocki su redom

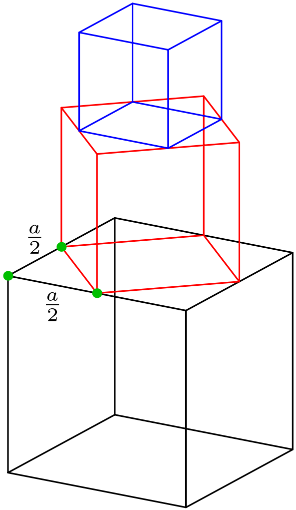
$$a, \ \frac{a}{\sqrt{2}}, \ \frac{a}{2}, \ \frac{a}{2\sqrt{2}}, \ \frac{a}{4}, \ldots$$

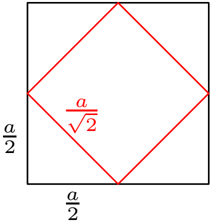
✏ Volumeni kocki su redom

$$a^3, \ \frac{a^3}{2\sqrt{2}}, \ \frac{a^3}{8}, \ \frac{a^3}{16\sqrt{2}}, \ \frac{a^3}{64}, \ldots$$

$$a^3 + \frac{a^3}{2\sqrt{2}} + \frac{a^3}{8} + \frac{a^3}{16\sqrt{2}} + \frac{a^3}{64} + \cdots =$$

Rješenje





$$\sum_{n=1}^{\infty} a_1 q^{n-1} = \frac{a_1}{1-q}$$

$$a_1 = a^3, \; q = \frac{1}{2\sqrt{2}}$$

$$|q| < 1$$

✏ Duljine bridova kocki su redom

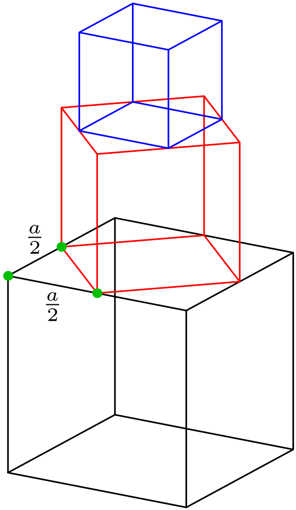
$$a, \; \frac{a}{\sqrt{2}}, \; \frac{a}{2}, \; \frac{a}{2\sqrt{2}}, \; \frac{a}{4}, \ldots$$

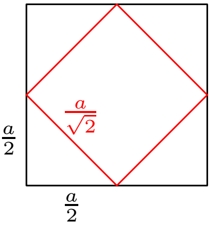
✏ Volumeni kocki su redom

$$a^3, \; \frac{a^3}{2\sqrt{2}}, \; \frac{a^3}{8}, \; \frac{a^3}{16\sqrt{2}}, \; \frac{a^3}{64}, \ldots$$

$$a^3 + \frac{a^3}{2\sqrt{2}} + \frac{a^3}{8} + \frac{a^3}{16\sqrt{2}} + \frac{a^3}{64} + \cdots =$$

Rješenje





$$\sum_{n=1}^{\infty} a_1 q^{n-1} = \frac{a_1}{1-q}$$

$$a_1 = a^3, \quad q = \frac{1}{2\sqrt{2}}$$

$$|q| < 1$$

✏ Duljine bridova kocki su redom

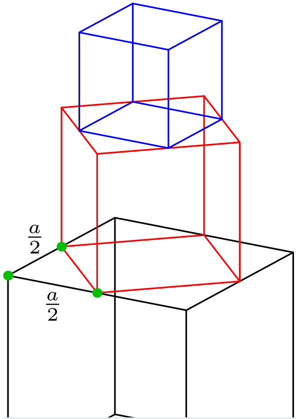
$$a, \ \frac{a}{\sqrt{2}}, \ \frac{a}{2}, \ \frac{a}{2\sqrt{2}}, \ \frac{a}{4}, \ldots$$

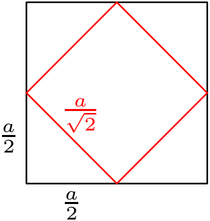
✏ Volumeni kocki su redom

$$a^3, \ \frac{a^3}{2\sqrt{2}}, \ \frac{a^3}{8}, \ \frac{a^3}{16\sqrt{2}}, \ \frac{a^3}{64}, \ldots$$

$$a^3 + \frac{a^3}{2\sqrt{2}} + \frac{a^3}{8} + \frac{a^3}{16\sqrt{2}} + \frac{a^3}{64} + \cdots = \frac{a^3}{1 - \frac{1}{2\sqrt{2}}}$$

Rješenje





$$\sum_{n=1}^{\infty} a_1 q^{n-1} = \frac{a_1}{1-q}$$

$$a_1 = a^3, \quad q = \frac{1}{2\sqrt{2}}$$

$$|q| < 1$$

✏ Duljine bridova kocki su redom

$$a, \ \frac{a}{\sqrt{2}}, \ \frac{a}{2}, \ \frac{a}{2\sqrt{2}}, \ \frac{a}{4}, \ldots$$

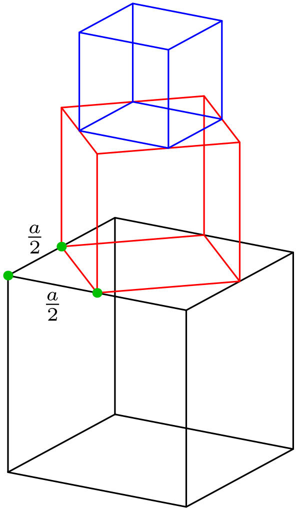
✏ Volumeni kocki su redom

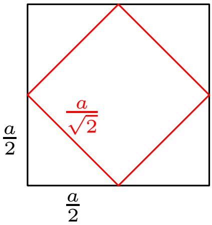
$$\frac{a^3}{2\sqrt{2}}, \ \frac{a^3}{8}, \ \frac{a^3}{16\sqrt{2}}, \ \frac{a^3}{64}, \ldots$$

$$\frac{a^3}{1-\frac{1}{2\sqrt{2}}} = \frac{a^3}{1-\frac{1}{2\sqrt{2}}\cdot\frac{\sqrt{2}}{\sqrt{2}}} = \frac{a^3}{1-\frac{\sqrt{2}}{4}} = \frac{4a^3}{4-\sqrt{2}}$$

$$a^3 + \frac{a^3}{2\sqrt{2}} + \frac{a^3}{8} + \frac{a^3}{16\sqrt{2}} + \frac{a^3}{64} + \cdots = \frac{a^3}{1-\frac{1}{2\sqrt{2}}} = \frac{4a^3}{4-\sqrt{2}}$$

Rješenje





$$\sum_{n=1}^{\infty} a_1 q^{n-1} = \frac{a_1}{1-q}$$

$$a_1 = a^3, \; q = \frac{1}{2\sqrt{2}}$$

$$|q| < 1$$

✏ Duljine bridova kocki su redom

$$a, \; \frac{a}{\sqrt{2}}, \; \frac{a}{2}, \; \frac{a}{2\sqrt{2}}, \; \frac{a}{4}, \ldots$$

✏ Volumeni kocki su redom

$$a^3, \; \frac{a^3}{2\sqrt{2}}, \; \frac{a^3}{8}, \; \frac{a^3}{16\sqrt{2}}, \; \frac{a^3}{64}, \ldots$$

$$a^3 + \frac{a^3}{2\sqrt{2}} + \frac{a^3}{8} + \frac{a^3}{16\sqrt{2}} + \frac{a^3}{64} + \cdots = \frac{a^3}{1 - \frac{1}{2\sqrt{2}}} = \frac{4a^3}{4-\sqrt{2}}$$