ANALIZA MATEMATYCZNA

LISTA ZADAŃ 6

15.11.2021

1. Znajdź promień zbieżności szeregów potęgowych:

(a) $\displaystyle\sum_{n=1}^{\infty} \frac{\binom{3n}{n} x^n}{n^2}$,

(b) $\displaystyle\sum_{n=1}^{\infty} \frac{2^{n+7} x^{6n}}{\sqrt{n}}$,

(c) $\displaystyle\sum_{n=1}^{\infty} \frac{(54n+1)^n x^{3n}}{(81n+2)^n}$,

(d) $\displaystyle\sum_{n=1}^{\infty} 10^{n^2} x^{n^3}$,

(e) $\displaystyle\sum_{n=1}^{\infty} n!\, x^{2^n}$,

(f) $\displaystyle\sum_{n=1}^{\infty} \frac{10^n x^n}{n^{10}}$,

(g) $\displaystyle\sum_{n=1}^{\infty} \frac{x^n}{n\, 10^{n-1}}$,

(h) $\displaystyle\sum_{n=1}^{\infty} 50^n\, x^{2n+5}$,

(i) $\displaystyle\sum_{n=1}^{\infty} \frac{x^n}{n(n+1)}$,

(j) $\displaystyle\sum_{n=1}^{\infty} \frac{x^{2n}}{\sqrt{n^2+n}-n}$,

(k) $\displaystyle\sum_{n=1}^{\infty} \frac{4^{n+5} x^{3n+7}}{n\, 6^{2n}}$,

(l) $\displaystyle\sum_{n=1}^{\infty} \frac{(2n)! x^n}{(n!)^3}$,

(m) $\displaystyle\sum_{n=1}^{\infty} \frac{n!}{n^n} x^{n+7}$,

(o) $\displaystyle\sum_{n=1}^{\infty} \binom{4n}{n} x^n$,

(p) $\displaystyle\sum_{n=1}^{\infty} n!\, x^{n^2}$,

(q) $\displaystyle\sum_{n=1}^{\infty} \binom{n+10}{n} x^n$,

(r) $\displaystyle\sum_{n=1}^{\infty} \frac{n!\,(3n)!}{(2n)!\,(2n)!}\, x^n$,

2. Znajdź granice:

(a) $\displaystyle\lim_{x\to 7} \Big(\frac{1}{x-7} - \frac{8}{x^2-6x-7}\Big)$,

(b) $\displaystyle\lim_{x\to 0} x \sin\Big(\frac{1}{x}\Big)$,

(c) $\displaystyle\lim_{x\to 4} \frac{\sqrt{x}-2}{x-4}$,

(d) $\displaystyle\lim_{x\to 3} \frac{x-3}{x+2}$,

(e) $\displaystyle\lim_{x\to 5} \frac{x^2-6x+5}{x-5}$,

(f) $\displaystyle\lim_{x\to 1} \Big(\frac{1}{1-x} - \frac{3}{1-x^3}\Big)$,

(g) $\displaystyle\lim_{x\to 1} \frac{x^{2007}-1}{x^{10}-1}$,

(h) $\displaystyle\lim_{x\to 1/2} \frac{8x^3-1}{6x^2-5x+1}$,

(i) $\displaystyle\lim_{x\to -2} \frac{x^3+3x^2+2x}{x^2-x-6}$,

(j) $\displaystyle\lim_{x\to 0^+} \frac{x-\sqrt{x}}{\sqrt{x}}$,

(k) $\displaystyle\lim_{x\to 1} \frac{(x-1)\sqrt{2-x}}{x^2-1}$,