

ANALIZA MATEMATYCZNA

LISTA ZADAŃ 6

13.11.2023

1. Znajdź promień zbieżności szeregów potęgowych:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

2. Znajdź granice:

$$(a) \lim_{x \rightarrow 7} \left(\frac{1}{x-7} - \frac{8}{x^2 - 6x - 7} \right),$$

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

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

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

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

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

$$(b) \lim_{x \rightarrow 0} x \sin \left(\frac{1}{x} \right),$$

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

$$(f) \lim_{x \rightarrow 1} \left(\frac{1}{1-x} - \frac{3}{1-x^3} \right),$$

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

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