

ZESTAW ZADAŃ 4

Zadanie 4.1

Oblicz granice:

$$\lim_{n \rightarrow \infty} \left(1 + \frac{1}{n+3}\right)^{n+2} \quad (1a) \qquad \lim_{n \rightarrow \infty} \left(1 + \frac{1}{n^2}\right)^n \quad (1d)$$

$$\lim_{n \rightarrow \infty} \left(\frac{n+2}{n}\right)^n \quad (1b) \qquad \lim_{n \rightarrow \infty} \left(1 - \frac{1}{n^2}\right)^{n^2} \quad (1e)$$

$$\lim_{n \rightarrow \infty} \left(1 + \frac{1}{n}\right)^{n^2} \quad (1c) \qquad \lim_{n \rightarrow \infty} \frac{3^n n!}{n^n} \quad (1f)$$

Zadanie 4.2

Zbadaj zbieżność szeregów:

$$\sum_{k=1}^{\infty} \frac{\pi}{k^2} \quad (2a) \qquad \sum_{k=0}^{\infty} \frac{3k}{3^k} \quad (2g)$$

$$\sum_{k=1}^{\infty} \operatorname{tg}(1/k) \quad (2b) \qquad \sum_{k=1}^{\infty} (-1)^k \frac{\ln k}{k} \quad (2h)$$

$$\sum_{k=0}^{\infty} \frac{1}{(2k)!} \quad (2c) \qquad \sum_{k=1}^{\infty} \frac{k!}{k^k} \quad (2i)$$

$$\sum_{k=0}^{\infty} \left(\frac{1}{k!}\right)^2 \quad (2d)$$

$$\sum_{n=1}^{\infty} \frac{\sqrt{n+1} - \sqrt{n}}{n} \quad (2e) \qquad \sum_{k=1}^{\infty} \frac{3 \cdot 4^k}{4 k^2 3^k} \quad (2j)$$

$$\sum_{n=1}^{\infty} \sqrt[n]{n} \quad (2f) \qquad \sum_{n=1}^{\infty} \frac{(7n+5)(4n!)}{10^{4n}(n!)^4} \quad (2k)$$

Zadanie 4.3

Oblicz dla $a > 0$ granicę:

$$\lim_{n \rightarrow \infty} \frac{a^n n!}{n^n}. \quad (3)$$