

Matematyka – Budownictwo I rok  
Zadania do samodzielnego rozwiązania

Seria II

1. Wyznaczyć granicę ciągu a)  $\lim_{n \rightarrow +\infty} \frac{\sqrt{5n^2 + 17n + \sqrt{2n^4 + 5n + 2}} - 2n}{\sqrt{5n^2 + 17n + \sqrt{2n^4 + 5n + 2}} + 2n}$ ,

b)  $\lim_{n \rightarrow +\infty} \left( \frac{1-2n}{3-2n} \right)^{\frac{\sqrt{2n-1}-\sqrt{2n+1}}{\sqrt{3n^3-1}-\sqrt{3n^3+3n+1}}}$ , c)  $\lim_{n \rightarrow +\infty} \left( \frac{\sqrt{2n-1}-\sqrt{2n+1}}{\sqrt{3n-1}-\sqrt{3n+1}} \right)^{2n-1}$ ,

d)  $\lim_{n \rightarrow +\infty} \sqrt[3n+2]{\left( \frac{1-2n}{3-2n} \right)^{3n+2} + e^{2n-1} + 4^{\frac{3n^2+1}{5n-\sqrt{n}}}}$ , e)  $\lim_{n \rightarrow +\infty} \frac{\sqrt{1+\sqrt{1+\sqrt{1+2n}}} - 1}{\sqrt{1+\sqrt{1+\sqrt{1+3n}}} - 1}$ ,

f)  $\lim_{n \rightarrow +\infty} \sqrt[3n+2]{2^{\frac{3n^2+2}{5n+1}} + 2^{\frac{6n^2+2}{10n+1}} + 4^{\frac{5n^2+1}{5n-\sqrt{n}}} + 1}$ , g)  $\lim_{n \rightarrow +\infty} \left( \frac{\sqrt{1+\sqrt{1+3n}} - 1}{\sqrt{1+\sqrt{1+3n}} - 1} \right)^{\sqrt[3n-e]{3n+2}}$ .

2. Wyznaczyć granicę ciągu : a)  $\begin{cases} a_1 = 5 \\ a_{n+1} = \frac{1}{4}\sqrt{15+a_n}, \quad n > 1 \end{cases}$ , b)  $\begin{cases} a_1 = 5 \\ a_{n+1} = \frac{1+a_n}{2}, \quad n > 1 \end{cases}$ ,

c)  $\begin{cases} a_1 = 5 \\ a_{n+1} = 2 + \sqrt{10+a_n}, \quad n > 1 \end{cases}$ , d)  $\begin{cases} a_1 = 3 \\ a_{n+1} = \frac{1+3a_n}{2}, \quad n > 1 \end{cases}$ , e)  $\begin{cases} a_1 = 5 \\ a_{n+1} = \frac{1+a_n^2}{2}, \quad n > 1 \end{cases}$ .

3. Z badać ciągłość funkcji danej wzorem  $y=f(x)$ , gdzie :

a)  $f(x) = \begin{cases} \frac{3x^2 + 5x - 8}{4x^2 + 5x - 9}, & \text{dla } x > 1 \\ \frac{11}{13}, & \text{dla } x = 1 \\ \frac{5x^2 + x - 6}{2x^2 + 9x - 11}, & \text{dla } x < 1 \end{cases}$ ,

b)  $f(x) = \begin{cases} \arcsin \sqrt[4]{\frac{4x^2 - x - 5}{10x^2 + 4x - 6}}, & \text{dla } x > -1 \\ \frac{\pi}{3}, & \text{dla } x = -1 \\ \pi - \arccos \sqrt[6]{\frac{25x^2 + 23x - 2}{62x^2 + 60x - 2}}, & \text{dla } x < -1 \end{cases}$ .